..THE IRON AGE..

NEW YORK, MARCH 3, 1932

ESTABLISHED 1855

VOL. 129, No. 9

PROGRESS IN ATOMIC HYDROGEN WELDING

By SAMUEL MARTIN, JR.
Industrial Engineering Department,
General Electric Co., Schenectady, N. Y.

ATOMIC hydrogen welding affords a temperature of 4000 deg. C., as compared with 3600 deg. C. for the electric arc and 3200 deg. C. for the oxyacetylene flame.

Due to this higher temperature and to its producing a reducing atmosphere, the use of atomic hydrogen welding broadens the field of welding to include many alloys and light-gage materials.

IN atomic hydrogen welding an electric arc is established and maintained between two tungsten electrodes. Fed into this arc and surrounding the electrodes is molecular hydrogen. The intense heat of the electric arc breaks down the molecular hydrogen and it becomes atomic hydrogen which has absorbed a large amount of heat. Molecular hydrogen is continually being blown into the arc and it displaces the atomic hydrogen. This action removes the atomic hydrogen from the intense heat of the arc and, becoming cooler, it recombines to form molecular hydrogen. In recombining it gives up the heat absorbed in its dissociation. The temperature of this reaction is approximately 4000 deg. C. as compared with the electric arc at 3600 deg. C. and the oxyacetylene flame of 3200 deg. C.

There are several important functions of the hydrogen in this method of welding. First, it acts as heat intensifier, as explained above. Second, it envelops the work in a reducing atmosphere, protecting the molten metal and preventing the formation of oxides, which are harmful. Third, it protects the tungsten electrodes and keeps them from being consumed rapidly. The hydrogen as it comes from the arc in its atomic state forms a fan-shaped flame. It is with the fringe of this flame that the welding is accomplished.

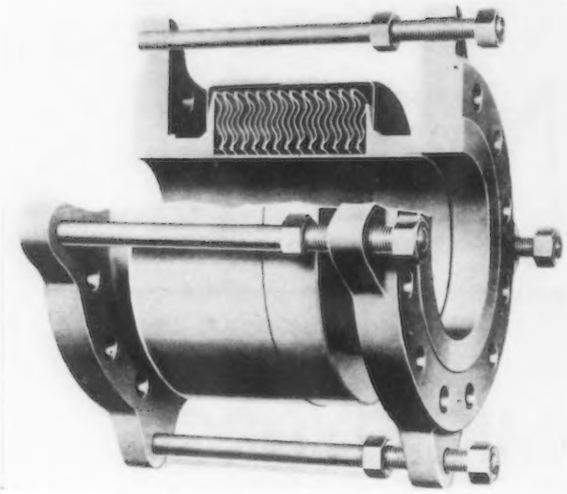
The atomic hydrogen method of welding does not displace other methods of welding. It broadens the field of electric welding to include many alloys, as well as light-gage materials. It can be used for heavy work as well as light work. It has been used to weld successfully steels with carbon content as high as 1.25 per cent. It is evident that the use of the atomic hydrogen flame is a step forward in the art of welding.

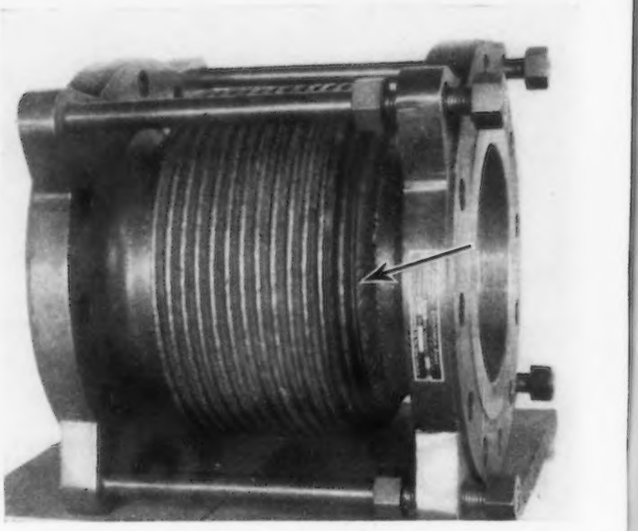
Smooth and Strong Welds Are Produced

The quality of the resultant weld is above the average. Oxides and other impurities are minimized by the shield of hydrogen which is constantly playing on the molten metal. This can have only one result: stronger, ductile welds free from porosity and slag inclusions. Another important feature of a weld which has been made with this process is that it is smooth and has a finished appearance.

In order to verify the above statements consider some of the applications of this process in industry. Boilers with a working pressure of 150 lb. per sq. in. and a test pressure of 750 lb. per sq. in. have been manufactured with this process. These boilers were 22 ft. long, 3½ ft. in diameter and made from ½-in. shells with ⅝-in. heads. The 41.2 ft. of welding on such a boiler was accomplished at the net rate of 2 ft. an hour.

Figs. 1 and 2 illustrate a flexo-disk expansion joint as manufactured by the Croll-Reynolds Engineering Co. The sectional view illustrates clearly the location of the weld on the corrugated, nickel-steel expansion element. This weld is subjected to extremely severe service because the expansion and contraction of the pipe line constantly flexes the welded joint. The tensile strength of this weld is 175,000 lb. per sq. in. In the





Figs. 1 and 2.—This flexo-disk expansion joint, made by the Croll Reynolds Engineering Co., has a corrugated, nickel-steel expansion element. This is welded to the heads with atomic hydrogen, giving a tensile strength of weld of 175,000 lb. per sq. in.

figure showing the completed joint the smoothness of the finished product can clearly be discerned.

Many other similar applications where quality is the important feature of the product can be named. For example, consider the gas-fired furnace, the combustion chamber of which is illustrated in Fig. 3. This is another example of an atomic hydrogen weld subject to expansion and contraction. Not only that, but the welded joints are subject to heat and under all these conditions must be gas-tight. The flues to this furnace are also welded by the atomic hydrogen process.

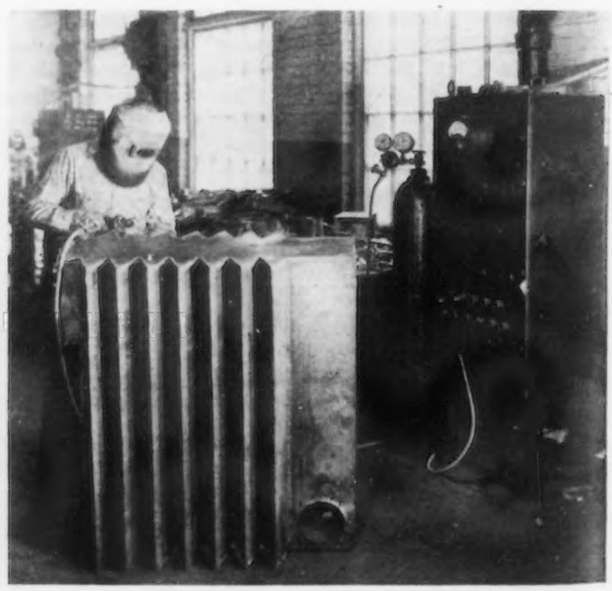
Welding Thin Sheet-Steel Stock

Fig. 4 illustrates the atomic hydrogen welding equipment being used to weld thin sheet-steel stock. The piece is first formed to the cylindrical shape shown and then clamped in a jig. The seam is backed up so that the molten metal, which is quite fluid under the atomic hydrogen flame, will not fall through, leaving a hole in the finished weld. This enables the operator to complete the seam quickly without the use of filler rod. The particular job illustrated is made of 16-gage sheet steel and is welded at the rate of 15 in. per minute. Another user of this equipment obtains a welding speed of 28 in. per min. on 20-gage steel. These are practical speeds which are obtained daily.

As alloy steels are coming into common use, it is imperative that a suitable process be available for welding them. The atomic hydrogen

Fig. 4.—Thin sheet-steel stock for center drums on cable reels being welded in a jig by R. B. Hayward Co., Chicago. The atomic hydrogen process is employed for this purpose.

Fig. 3.—(Below) The sheet-metal section joints of this gas-fired furnace are quickly welded, at the plant of Emil Steinhorst & Son, Utica, N. Y., by means of the atomic hydrogen process.



process has been successfully applied to most alloys. Chrome steels, including those having a chromium content up to 40 per cent, have been welded. The resultant welds are not particularly brittle if the chromium content is less than 20 per cent. Heat treatment after welding relieves any tendency to brittleness, giving a strong ductile weld. The class of steels included under the above contains Ascoloy, which has a chromium content between 12 and 16 per cent.

Modifications of the original chrome steels have resulted in stainless steels, and many other special alloys such as KA-2, Enduro, Allegheny metal and Super-ascoloy. Most of the modifications have been in the addition of nickel in some percentage to the chrome steel. This added nickel to chrome steels aids in the welding and makes possible a strong ductile weld without heat treatment. An example is the welds made on Super-ascoloy, 17 to 20 per cent chromium and 7 to 10 per cent nickel, which are strong and ductile.

Welding Non-Ferrous Alloys

Some non-ferrous alloys can be welded satisfactorily by the atomic hydrogen process. Calorite, a 15 to 20 per cent chromium 80 to 85 per cent nickel alloy, can be welded not only in a worked form, but also in the form of a casting. This metal is used for resistance units and heaters for electric furnaces, in which the welds are subjected to severe strains which they readily withstand.

A more common non-ferrous alloy is brass. As a general rule alloys of copper and zinc are difficult to weld because of the lower melting point of zinc. The result, therefore, in welding this metal is that the zinc has a tendency to vaporize before the copper has reached its melting point. When the brass contains more than 40 per cent zinc it is practically impossible to weld it. For brass with a zinc content of less than 40 per cent the aid of a flux is needed in welding it with the atomic hydrogen process. There is one very interesting application of atomic hydrogen welding to brass which is worth noting.

In the manufacture of thin brass strips it is necessary to draw the metal down from say ⅛ in. thick to 0.01 in. In doing this the strips are passed back and forth between rolls several times. The metal can readily be wound on spools at the end of each pass. It is impractical to take a small piece of brass and continually reverse and set the machinery in motion. Therefore, one manufacturer joins together several pieces of brass by welding, using the atomic hydrogen process. The weld is but a few inches wide at the start and several feet wide at the end of the rolling operation. The successful result can only be obtained by welding the sheets with the atomic hydrogen process, because the weld is sound and free from porosity.

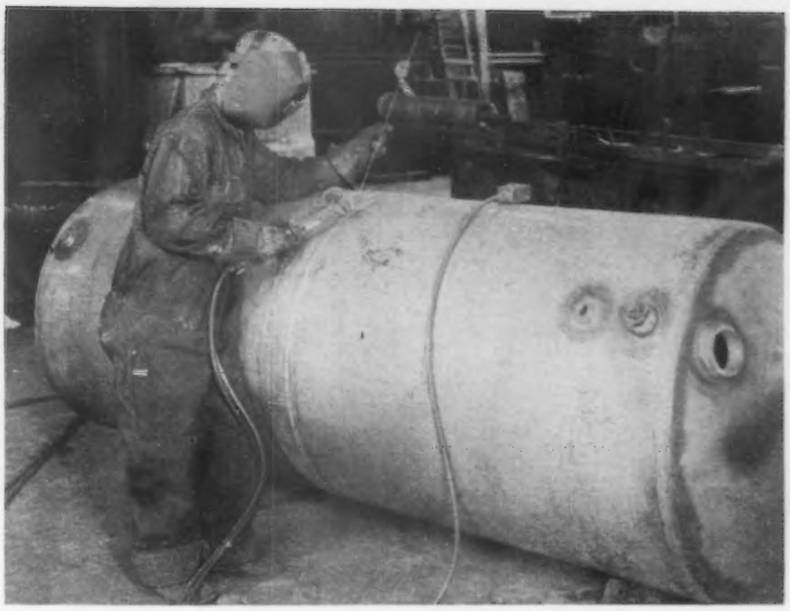


Fig. 5.—The Liberty Coppersmithing Co., Philadelphia, uses this process in welding Monel metal gasoline storage tanks.

Welding Monel Metal

A Monel metal gasoline storage tank is shown being fabricated in Fig. 5. This tank is 3 ft. in diameter and 8 ft. long, and made from 3/16 in. stock. The complete fabrication of the tank was accomplished by the atomic hydrogen welding process. This illustration also shows the operator adding filler metal to the seam. This is necessary when there is an opening of any sort to be filled in order to complete the joint.

Other Uses for the Process

The atomic hydrogen welding process is not limited to fabrication of new products. It has proved itself invaluable in the repair of saws, dies and other odd jobs. In welding in a piece of the saw blade, as illustrated in Fig. 6, the atomic hydrogen equip-

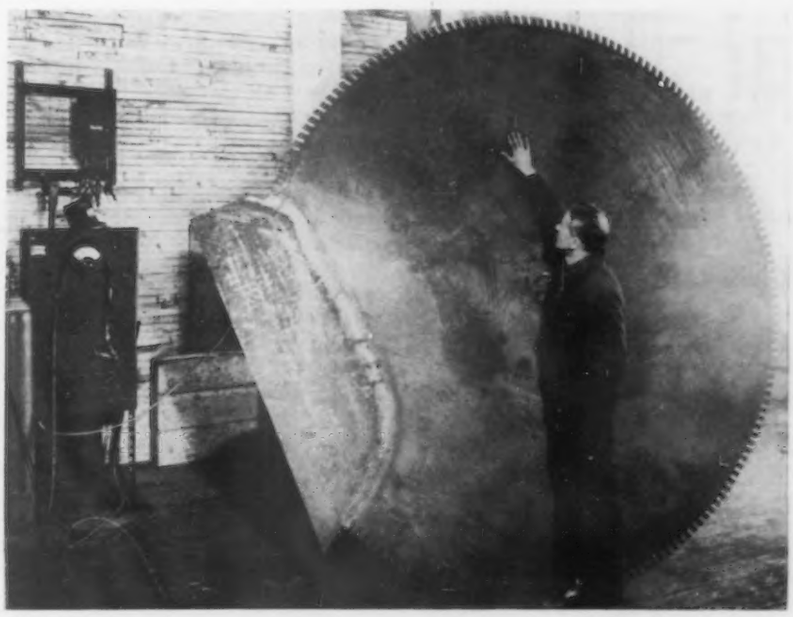


Fig. 6.—A new section was inserted in this 108-in. inserted-tooth cut-off saw by the atomic welding process in the shop of Vance Scales Co., Tacoma, Wash.

FIG. 7.—The atomic welding process is applicable to building up hard surfaces on tool bits and repairing dies. This shows a hard surface cutter being built in the plant of the Hughes Tool Co., Houston, Tex.

ment more than paid for the initial investment.

When such savings can be accounted for in an individual job, it indicates that the atomic hydrogen welding process has established itself as a leader in the field of quality welding. Fig. 7 shows some drills being repaired. The hard surface on cutter bits has been successfully built up by this process.

Automobile manufacturers have used the process for successful repair of their dies. Sometimes it is necessary to preheat the work before surfacing, as this not only aids in welding, but also prevents cracking of the die being surfaced. Die metals of the following analyses have been welded successfully by several companies:

1. 0.9 per cent carbon, 1.5 per cent manganese
2. 2.5 per cent carbon, 13 per cent chromium
3. 1.5 per cent carbon, 12 per cent chromium, 0.30 per cent manganese
4. 1.5 per cent carbon, 12 per cent chromium, 1.1 per cent molybdenum, 0.15 per cent boron, 0.5 per cent nickel.

In the repair of a die the filler or surfacing material should be the same analysis as the die itself.

Many hard surfacing materials, including Stellite, Stoodite, Cristite, Borod, Blackor and tungsten carbide, have been successfully applied to drills, dies and other equipment requiring high wear-resisting surfaces by the atomic hydrogen process.

A New Welding Material for Manganese Steel

UNTIL quite recently autogenous welding of Hadfield's manganese steel has not been satisfactory, because of the unreliability of the welds secured, said John Howe Hall, technical assistant to the president, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., in a recent address before the New York Chapter of the American Society for Steel Treating. This is due to the fact that the heat of welding damages the manganese steel close to the weld, and when welding rods are used, which deposit metal of analysis similar to the castings, failure of the welds in service often occurs in the damaged metal close to the weld.

About four years ago the Taylor-Wharton Iron & Steel Co. developed a special manganese steel, known as "Timang," which contains from 0.60 to 0.80 per cent carbon, from 12 to 15 per cent manganese and approximately 3 per cent nickel. This steel does not require water quenching to retain the austenitic condition with its accompanying strength and toughness, and ordinarily "Timang" steel parts are heat treated simply by normalizing.

With "Timang" welding rod the contact zone between the weld and the underlying manganese steel is far stronger than when welds are made with normal manganese steel rods, said Mr. Hall. This is thought to be due to the dilution of the carbon content in the contact zone, and to its impregnation with nickel by the metal derived from the welding rod. In any event it has been found by many types of laboratory tests that manganese steel parts welded with this new material are far stronger than similar parts welded with normal manganese steel.

Broken street railroad switch tongues have been successfully welded with this new rod and restored to service. Frogs, switches, and crossings for steam and electric railroad service, which have been worn down at the intersections, likewise have been successfully restored to their original elevation at a large saving over the purchase and installation of new castings. In addition a wide range of manganese steel crushing and wearing parts is being restored to service by this kind of welding. The wear secured from the welded part is in the majority of instances satisfactory, and is sometimes even as good as that of the original casting.

In addition to its use as a material for welding manganese steel, "Timang" is sold in the form of castings and also as rods, plate and sheet. In castings the principal applications are in parts subjected to heavy wear and at the same time to temperatures up to 600 deg. C. Long exposure to temperatures between 300 and 600 deg. C. destroys the strength and toughness of normal manganese steel, but the new material is found not to be damaged by these temperatures. As a result it has been used for numerous applications in steel works and other industries requiring a material capable of resisting heavy wear associated with exposure to hot materials. In rods the chief applications so far have been in woven screens. As plate it is used for chute liners, elevator buckets, car bearing liners, etc.

WIDE FLANGE BEAM MILL OF SOUTH CHICAGO WORKS

IN making roll changes, the entire stand is lifted out of the way and replaced by another that has meanwhile been assembled on the setting-up stand. For this purpose a 300-ton crane of 100 ft. span has been provided.

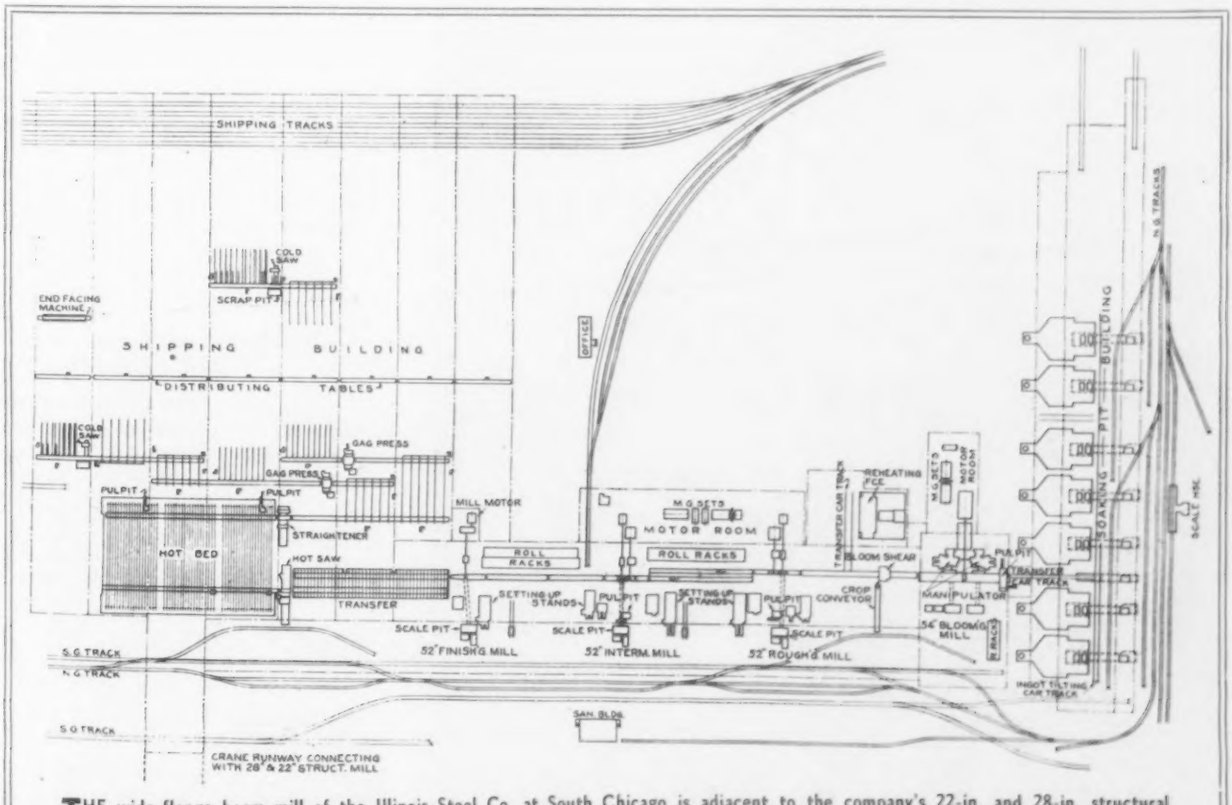
The large scale of operations, which include the making of wide-flange beams 36 in. in depth, may be indicated by the size of the motor equipment. Two motors, each of 5000 hp., drive the blooming mill; one of 7000 hp. and one of 2000 hp. take care of the roughing mill; a 6000-hp. and a 2000-hp. motor are the main sources of energy for the intermediate mill, and a 3000-hp. motor provides for the finishing mill. Correspondingly large motor-generator sets were required.

AMONG recent improvements and additions made by Iillinois Steel Co. are a new beam mill of 40,000 tons a month capacity and seven 150-ton stationary open-hearth furnaces at the Gary Works, and fourteen 150-ton stationary furnaces at the South Chicago Works. Wide flange structural shapes up to 425 lb. per foot can be produced on the new mill.

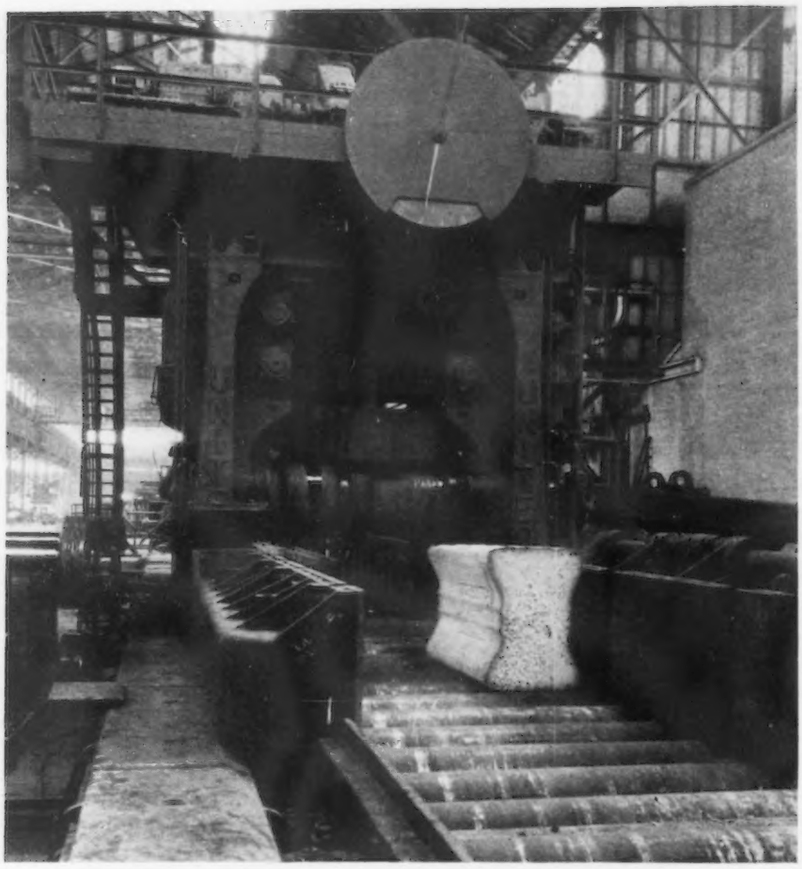
The new beam mill, put in operation in December, 1930, is designed to produce wide-flange structural shapes ranging from 8 in. to 36 in. in depth with flanges of 6 in. to 15 in. in width and weighing from 21 to 425 lb. per ft.

The mill is located at the northwest end of South Works adjacent to the existing 28-in. and 22-in. structural mills, thereby forming a group of mills with capacity for the production of a full line of structural shapes in sizes up to 36 in. in depth.

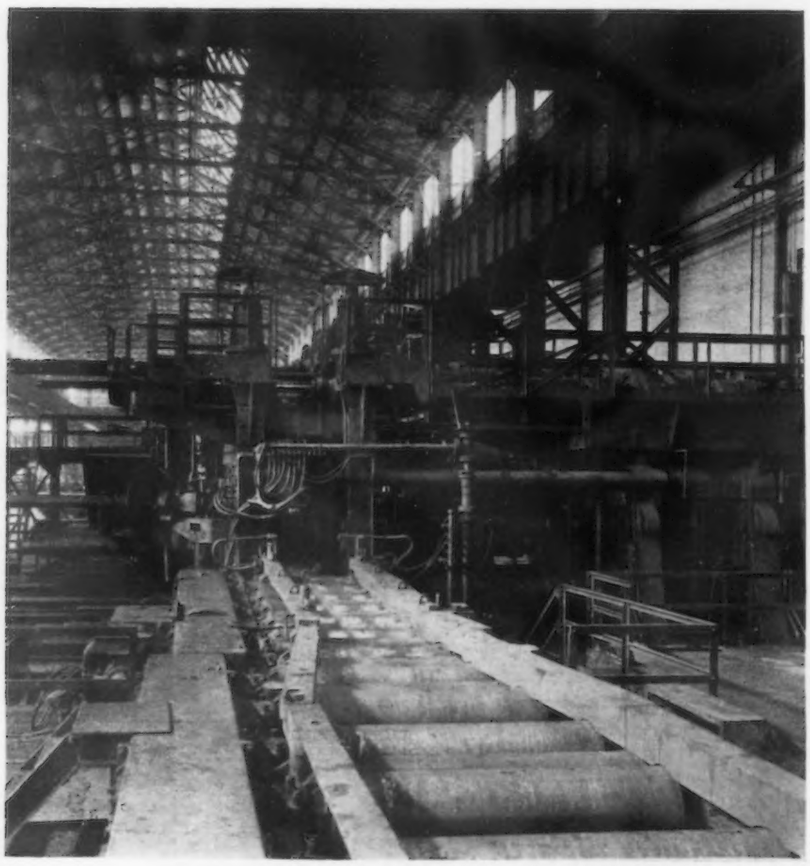
This mill consists of a 54-in. reversing blooming mill, a 52-in. re-



THE wide-flange beam mill of the Illinois Steel Co. at South Chicago is adjacent to the company's 22-in. and 28-in. structural mills. In connection with the general plan, the following center to center distances between stands may be given: Blooming mill to roughing mill, 271 ft.; roughing mill to intermediate mill, 210 ft.; intermediate mill to finishing mill, 241 ft.



An 18-ton ingot about to enter the rolls in the new wide flange beam mill.



Looking toward the west at the 52-in. roughing stand.

versing roughing mill stand, a 52-in. intermediate reversing stand, and a 52-in. one-pass finishing stand, all motor driven.

Soaking pit equipment, located in line with existing soaking pits serving the 28-in. and 22-in. mills, consists of seven furnaces of two holes each, with capacity for heating ingots required for the production of beams within the capacity of the mill. At the finishing end ample hot bed, cutting, straightening, handling and shipping facilities are provided in an area 720 x 690 ft., fully commanded by overhead traveling cranes. The soaking pit building contains seven two-hole soaking pits, fuel for which is provided by gas producers.

A number of sizes of ingots are used, the maximum weight being approximately 32,800 lb. Tunnels are installed below the soaking pits for handling slag and to provide easy access to valves, etc. Slag is run into pots and removed through a series of openings east of the pit building by means of a 10-ton overhead traveling crane.

Ingots are transferred to the mill by a tilting car operating the full length of the soaking pit building. Special electrical control equipment is installed by which the pit cranemen can control operation of the soaking pit covers and the ingot car. An electrically operated transfer car is used to move ingots from the tilting car to the blooming mill entering table.

Adjoining the soaking pit structure on the west is the 54-in. blooming mill building, containing the 54-in. reversing blooming mill stand, entering and delivery tables and manipulators.

Buildings and Crane and Motor Mill, Illinois Steel Co.

	Size, Ft.	Cranes
Soaking pit	145x798	two, 25 tons, 76 ft.
Blooming mill	125x207	100 tons, 115 ft.
Motor room	73.5x138	50 tons, 65 ft.
52-in. mill	110.5x756	300 tons, 100 ft. 50 tons, 100 ft.
Motor room	72x328	50 tons, 65 ft.
Motor room	.....	.....
Furnace building	63x 76 82x100	15 tons, 75 ft.
Spare storage	72x1023	10 tons, 65 ft.
Hot bed	244x100	
Storage runways	720x690	Eight of 20 tons

This mill is equipped with an electric roll changing device which greatly reduces the time for changing rolls. Racks are provided in the building for storage of rolls.

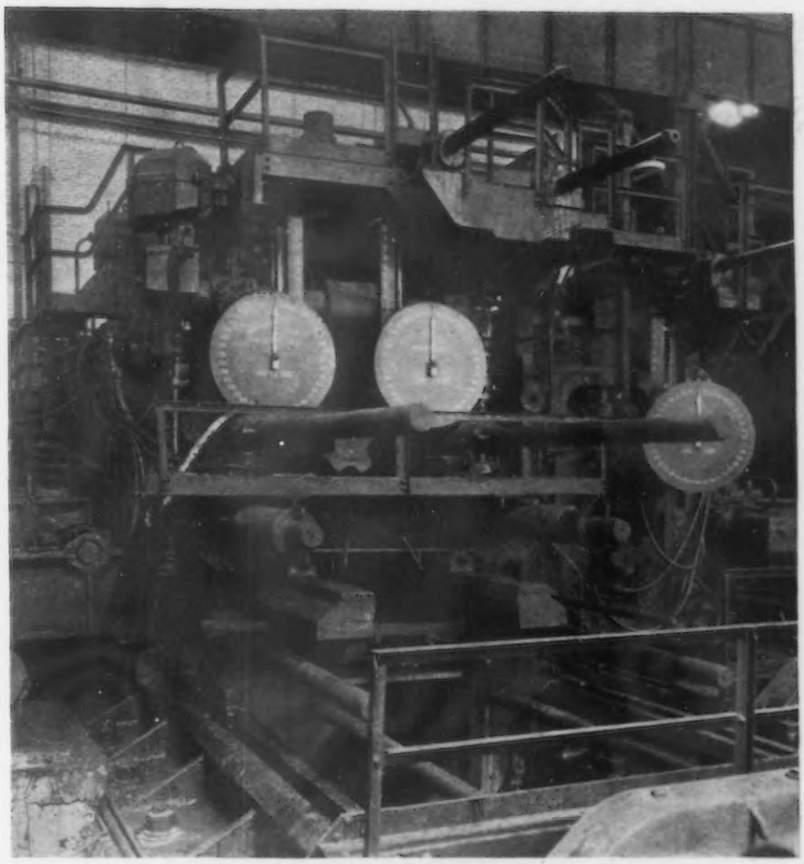
Next to the 54-in. blooming mill building on the west is the 52-in. mill building, containing a bloom shear, the reversing roughing mill stand, the intermediate reversing stand, and the one-pass finishing stand. Racks are also provided for roll storage in this building.

At the three mills, setting-up stands are provided where roll stand including housings and rolls may be assembled complete. When roll changes have to be made the entire mill stand is lifted out of the way by the 300-ton crane and provided with a roll stand already assembled on the setting-up stand.

Between the roughing and intermediate roll stands there is an off-set 11 ft. 3 in., in which the steel is transferred sideways before entering the intermediate stand. By this arrangement steel may be rolled in each stand simultaneously without interference and it has the advantage of bringing the roll stands closer together.

The spacing of the four stands is indicated in connection with the accompanying plan of the works.

The roughing and intermediate mills each have two separate roll stands, one being the main roll stand and the other the edging roll stand, provided with separate motor drives with pinions, couplings, etc., for each stand. The edging stand has horizontal rolls, but works only on the toe or edge of the flanges, while the main rolls work on the entire face of



End view of the 52-in. reversing roughing mill stand.

A view of the 52-in. finishing mill stand.

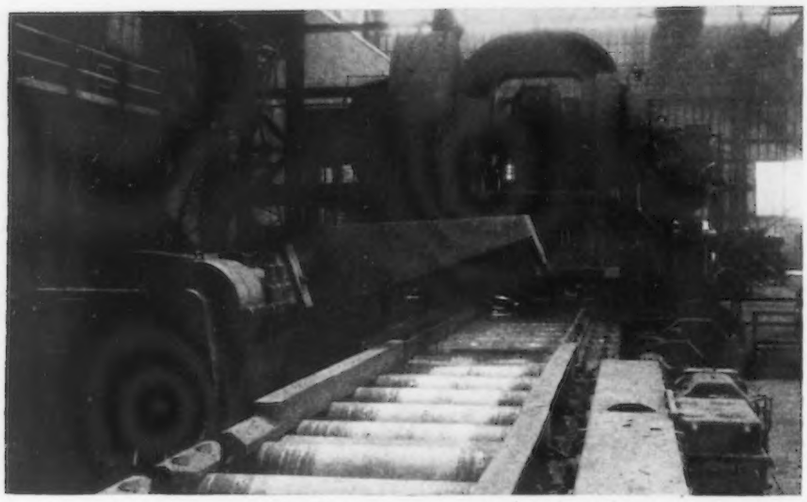
Equipment, Wide Flange Beam at South Chicago Works

Motors, etc.

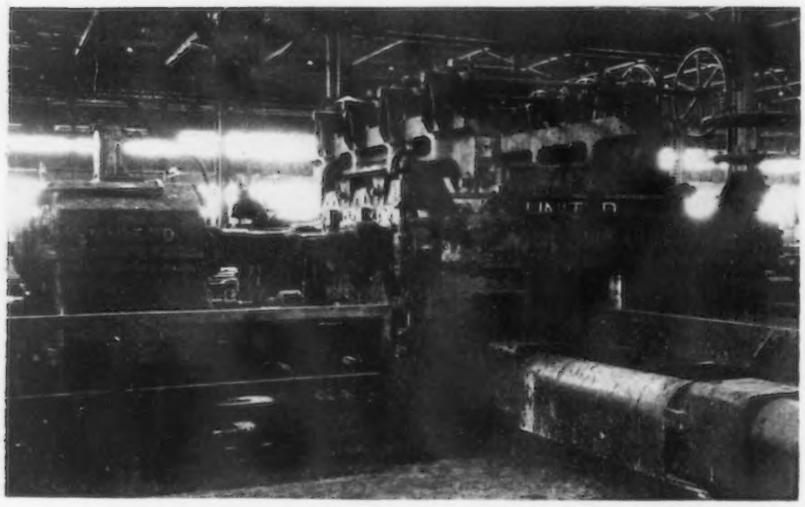
Two 5000-Hp. reversing
9000-Kw. motor-generator
1000-Kw. motor-generator

7000-Hp. reversing for roughing
2000-Hp. reversing for roughing edgers
6000-Hp. reversing for intermediate
2000-Hp. reversing for intermediate edgers
7000-Kw. motor-generator
6000-Kw. motor-generator

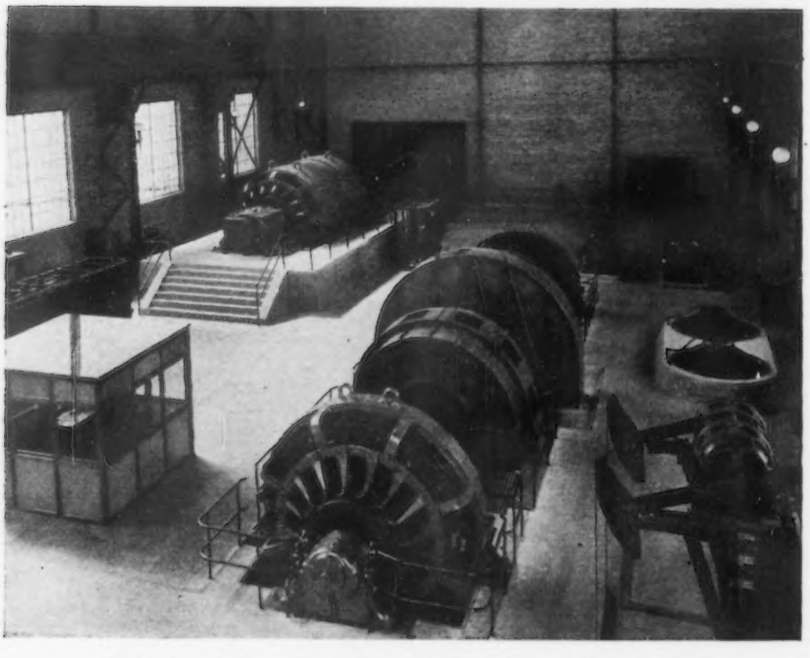
Two 1000-Kw. motor-generators for auxiliaries
3000-Hp. synchronous for finishing



The size of the blooming mill shear is 54 in.



A straightening machine is located at the finishing end of the beam mill.



General view of the motor room for the 54-in. reversing blooming mill.

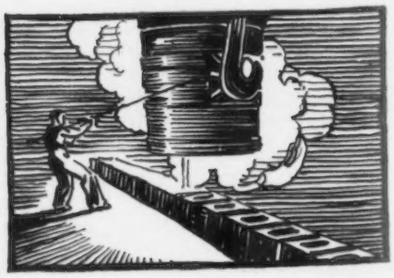
the web and the inside of the flanges. Between the necks of the main rolls is a set of rolls with vertical axes operating on tapered roller bearings which work on the outside of the flanges over the entire width. These rolls are not driven, their rotation being imparted by the steel passing through the main rolls.

Roughing and intermediate mills have automatic screw down devices which stop at predetermined settings by means of a specially designed limit switchboard. Through automatic control, proper speed relations are maintained between the motors driving the main and edging stands for any condition of drafting. Suitable operators' pulpits are provided at each stand for the housing of these automatic controls and switchboards.

Beyond the bloom shear, adjoining the 52-in. mill building on the north, is a furnace building, containing a reheating furnace for heating blooms up to 17 ft. in length. The function of this furnace is to maintain at rolling temperatures second and third cuts of long blooms, while the first cut is being rolled. The furnace is served by a 15-ton charging crane. A transfer car is used for transferring the bloom to the furnace and back to the roller table leading to the roughing mill.

Adjoining the blooming mill building on the north is a motor room, containing two 5000-hp. direct-current reversing motors, one driving the bottom roll and one the top roll of the 54-in. mill, separately. A 9000-kw. motor-generator set for furnishing d. c. current to the two mill motors and a 1000-kw. motor-generator set for furnishing d. c. current to auxiliary motors, together with other electrical equipment, is also located here.

On the north of the 52-in. mill building is a motor room. A 7000-hp. d. c. reversing motor drives the roughing mill main roll stand and a 2000-hp. d. c. reversing motor drives the 40-in. edging roll stand which forms part of this mill. The motor room also contains as tabulated a 6000-hp. d. c. reversing motor for the main



rolls of the intermediate mill and a 2000-hp. d. c. motor for the 40-in. edging roll stand of that mill and also the necessary motor generators.

In a separate motor room is located a 3000-hp. a. c. synchronous motor for driving the 52-in. one-pass finishing mill.

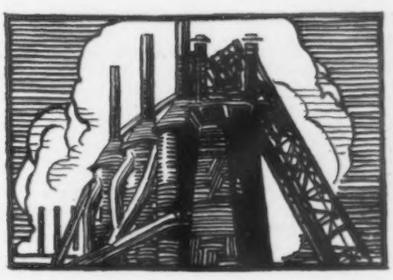
Adjoining the 52-in, mill building on the south is a spare storage building for keeping spare machinery. This building is served by a 10-ton traveling crane, used partly for handling scrap and scale from several scale pits located in the building.

On the west of the finishing mill is a hot saw and a hot bed, divided into three independent sections for flexibility in handling the product. Additional equipment is provided, such as gag presses for straightening beams, cold saws and end-facing machines, welding and cutting oxyacetylene torches and grinders for properly finishing the product.

Extending north at right angles to the mill are eight covered runways, enclosing a space, for storing materials while in the finishing process. Each runway is served by a 20-ton, double-trolley crane for handling and shipping. For handling material from one bay to the other a transfer table, 690 ft. in length, is used. Also, to facilitate handling of orders consisting of standard structural shapes and product of the new mill one crane runway from the finishing end of the existing structural mills overlaps one crane runway of the finishing end of the new beam mill.

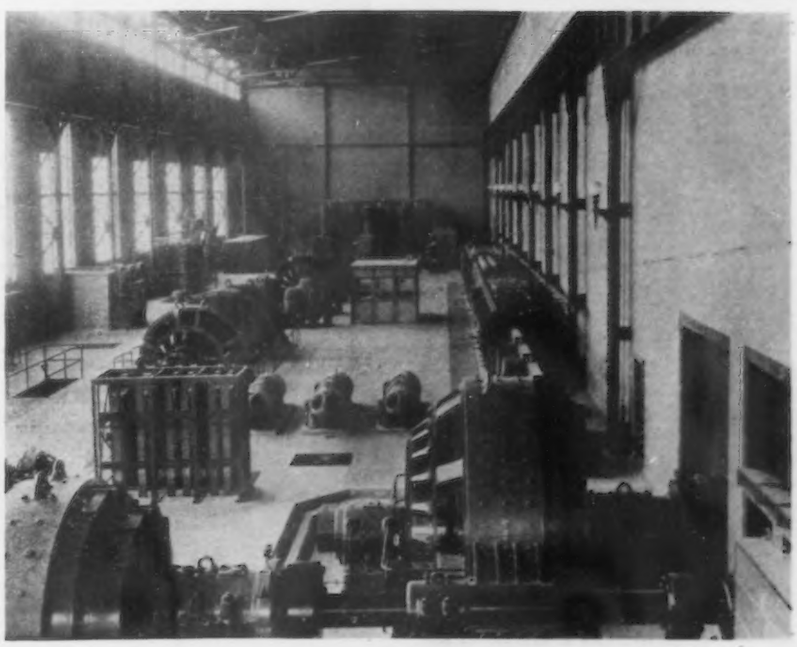
Suitable skid rails supported on foundations are installed in the storage yards, necessary because of the fact that very large tonnages are carried at all times and the loads per square foot are much greater than heretofore encountered. Depressed standard gage tracks run at right angles through these shipping runways at the extreme north end, permitting the loading of cars for shipment in each bay.

Miscellaneous buildings include offices, store rooms, laborers' quarters, sanitary buildings, also machine shop, electric shop, riggers, repair shop, etc.



The hot saw at the beam mill finishing end.

The gag press.



Showing motor room for 52-in. reversing roughing and intermediate mill.

ADDITION OF VAN

PROPERTIES OF MEDIUM

By W. C. HAMILTON

Research Director, American Steel Foundries, Chicago

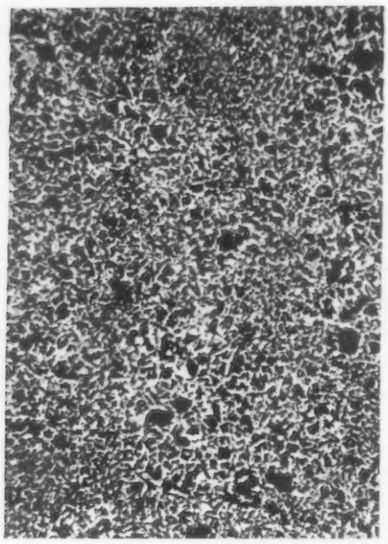


Fig. 1.—Microstructure of intermediate manganese steel at 100 diameters.

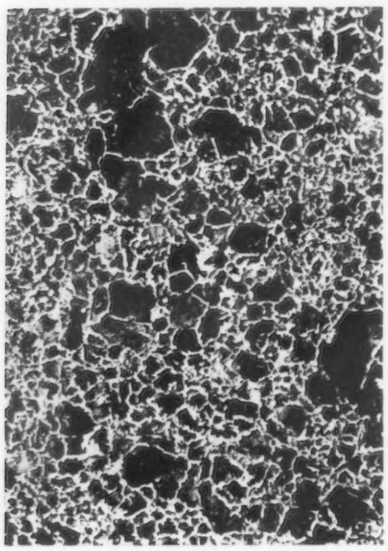


Fig. 2.—Structure of same steel as Fig. 1 after commercial normalizing (100 diameters).

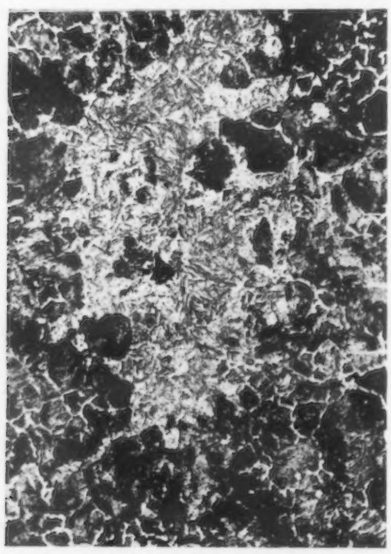


Fig. 3.—Typical structure of manganese segregation (100 diameters).

CARBON, manganese and silicon are all common constituents in any cast steel. When used without additional alloying agents, it is possible to obtain attractive physical properties from a proper combination of these three elements. Manganese and silicon are useful in obtaining the proper solidity, but, in addition, they both exert decided influence on physical properties. These two elements, in addition to carbon, must therefore be given due consideration in steels with or without the addition of other elements.

It is generally conceded that an intermediate manganese steel has attractive characteristics, but that erratic results are common. Manganese is a good deoxidizer and also aids in the removal of sulphur in basic practice. Hence manganese is a welcome constituent of pig iron or scrap used in most steel furnace charges.

Our knowledge of the iron-carbon-manganese system is incomplete, and there is still much to be learned about the behavior of manganese in steel, both with and without the influence of other elements. Manganese is known to exist in steel as a double carbide of manganese and iron, and also in solid solution. Under the microscope, intermediate manganese steel often shows decided segregation and, if the manganese is excessive, this segregation results in the formation of martensite in the manganese-rich areas when the steel has been cooled rapidly in air.

Fig. 4.—Same steel as Fig. 3 at 1000 diameters.

This manganese segregation is formed during solidification, and its effect can be changed only by heat treatment. We have in reality two types of steel represented when this manganese segregation occurs. The normal structure is pearlitic, while the areas rich in manganese are really air-hardening or martensitic steel. Whether or not this non-uniformity occurs depends largely on the ratio between the carbon and manganese in the steel. It is, therefore, extremely important to maintain the proper ratio between carbon and manganese in order to obtain uniformity in microstructures and therefore uniformity in physical results.

TABLE I—PHYSICAL PROPERTIES OF INTERMEDIATE MANGANESE STEEL AFTER DOUBLE NORMALIZING

Bar No.	Elongation, Per Cent	Reduction, Per Cent	Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Izod
1	26.5	55.2	70,100	107,550	20.0
2	26.0	58.1	65,700	107,400	25.0
3	31.0	59.6	59,750	90,900	28.0
4	26.0	51.9	68,700	111,850	17.0
5	25.0	52.8	65,450	107,250	16.0

Bar No. 3 contains somewhat lower carbon than the others.

ADIUM IMPROVES MANGANESE STEELS

INTERMEDIATE manganese steels (containing 1.25 to 2 per cent manganese) frequently show segregation and excessive grain growth under conditions prevailing in commercial production. The addition of about 0.10 per cent vanadium makes possible a proper carbon-manganese ratio, retards grain growth and eliminates manganese segregation. The resulting steel, according to the author, shows decided improvement in yield point and impact value.

Another undesirable factor in this intermediate manganese steel is due to the tendency for excessive grain growth. A large grain structure in plain intermediate manganese steel results in low impact values. It is possible to produce this type of steel without manganese segregation and also without excessive grain growth, but commercial steels generally are subject to both of these undesirable characteristics.

Fig. 1 shows the structure of intermediate manganese steel at a magnification of 100 diameters. This structure is quite uniform and has very little grain growth. Fig. 2 shows a structure of the same steel after a commercial normalizing, and this structure is considered representative of this type of steel when made without manganese segregation. Fig. 3 shows a typical example of manganese segregation. Even at this low magnification, the needle-like structures are readily seen. This same structure at 1000 diameters is shown in Fig. 4 where the needle-like structure is brought out more clearly. Steel of this nature, containing approximately carbon 0.35 per cent and manganese 1.40 per cent, while a double normalizing will give physical results as noted in Table I.

The addition of approximately 0.10 per cent vanadium to this intermediate manganese steel produces a marked improvement in microstructures and physical properties. Grain growth is decidedly retarded, and the vanadium addition makes possible a different ratio between the carbon and manganese, which results in a steel with superior physical properties and without manganese segregation. We obtain, therefore, an intermediate manganese steel without the manganese segregation and without excessive grain growth, resulting in a steel of a uniform structure and with therefore uniform physical properties. Erratic results, formerly obtained from the plain intermediate manganese steels, have not been encountered in this steel with the vanadium addition and with the proper carbon-manganese ratio.

With the same normalizing treatment, the structure of this manganese-vanadium steel is one designated as sorbitic rather than the

TABLE II—PHYSICAL RESULTS OF MANGANESE-VANADIUM STEEL AFTER DOUBLE NORMALIZING

Bar No.	Elongation, Per Cent	Reduction, Per Cent	Yield Point, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Izod
1	26.0	54.7	80,200	106,900	46.5
2	28.5	57.5	74,000	100,350	52.5
3	31.0	61.1	69,400	93,450	61.0
4	28.0	58.8	72,700	100,000	52.0
5	27.0	56.2	75,500	100,550	53.0
6	28.0	60.8	85,900	108,800	60.0
7	30.5	62.3	71,700	95,750	63.0

The lower tensile strengths, particularly in Nos. 3 and 7, are due to lower carbons.

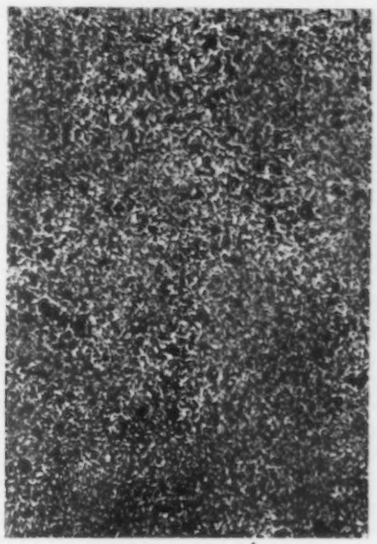


Fig. 5—Microstructure of manganese-vanadium steel (100 diameters).

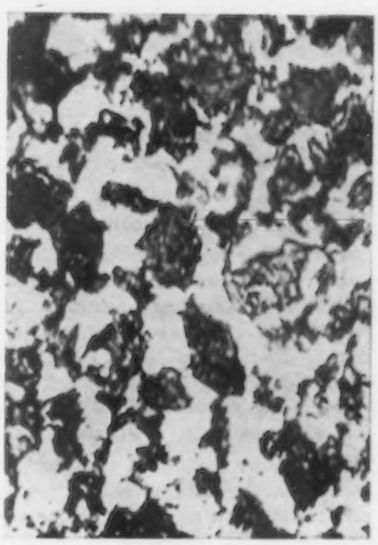


Fig. 6.—Same steel as Fig. 5 at 1000 diameters.

Fig. 7.—Pearlitic structure of intermediate manganese steel with no vanadium addition (1000 diameters).

pearlitic structure common to the plain intermediate manganese steels. Fig. 5 shows the structure of the manganese-vanadium steel. Fig. 6 gives the structure of this steel at 1000 diameters to show the sorbitic structure. This should be compared with Fig. 7 which illustrates the pearlitic structure of the intermediate manganese steel without the vanadium addition. In Table II are given physical results representing this manganese-vanadium steel after a double normalizing treatment.

This addition of vanadium, together with the proper carbon-manganese ratio, results in a steel with decided improvements in yield points and impact values; or if the same yield points are sufficient, the improvement in ductility and impact values would be even more pronounced.

As made by the American Steel Foundries, this intermediate manganese steel containing vanadium is designated as Hylastic vanadium steel.

Modern Pickling—Results Achieved with Acids and Inhibitors Reviewed

MODERN pickling practice, with special reference to the advantages of the various pickling acids and inhibitors, was the subject of an address by O. L. Thomas, technical director of the Grasselli Chemical Co., Grasselli, N. J., at a recent meeting of the Hartford, Conn., chapter of the American Society for Steel Treating.

Four Acids Commonly Used

The acids commonly used in pickling are: sulphuric, for its cheapness and ease of handling; muriatic, for its faster pickling and reduced pitting action; hydrofluoric, to remove sand; and nitric, for alloy steels and non-ferrous metals and alloys, and for the passivation of chrome steels.

Metal construction in the pickling room should be coated with pitch or acid-resistant paint, Mr. Thomas said. Good wooden tubs can be constructed with 6-in. x 6-in., 6-in. x 8-in., or 8-in. x 8-in. timbers painted with thick white lead, rabbeted and held together with bronze, monel or copper bolts, and lined with replaceable walls and bottom of 1-in. cypress or white pine locked in place with copper nails.

Steam hammering resulting from the use of open and steam pipes for heating the pickling bath will cause vibration and leakage. It can be prevented, Mr. Thomas stated, by using a Duriron inductor, by running the line to the bottom, by using a perforated pipe, or by increasing the number and decreasing size of steam inlets. Traps should be used to remove condensation to prevent excessive dilution.

For cleaning castings one part hydrofluoric acid, one part 20-deg. Be. muriatic acid, and six parts water are used in cypress tanks at 125 to 133 deg. F. The muriatic removes the rust and scale and saves hydrofluoric acid. Pickling time is about 45 min. to 1 hr.

For general scale removal sulphuric baths from 3 to 12 per cent, at temperatures from 120 to 180 deg. F., and with a pickling time of 30 to 45 min., are used. The tendency today is to employ larger equipment, which permits use of low acid strength, low temperature, and longer pickling time, thus insuring uniform pickling with less danger of burning, pitting, and wasting of metal. Where ideal conditions of capacity are present, 4 to 6 per cent acid at 150 deg. F. and 30 min. time give the best results. Acid and iron content may and should be carefully controlled. When operating with a 6 per cent acid solution, the iron content is allowed to grow to about 5 per cent. Standard capsules or tablets are available for checking acid and iron content.

Muriatic acid of 15 per cent solution is generally used in pitch-treated wooden tanks at 100 to 130 deg. F. for a pickling time of 30 min.

Acid consumption varies with the area pickled and the thickness of scale. Agitation of work or bath is essential to obtain thoroughly and uniformly pickled articles.

Pickling High-Chrome Steels

Representative pickling solutions for high-chrome steels are:

55 parts of 20 deg. Be. muriatic acid.
5 parts of 42 deg. Be. nitric acid.
40 parts of water.

or

5 parts of 20 deg. Be. muriatic acid.
5 parts of 42 deg. Be. nitric acid.
16 parts of 66 deg. Be. sulphuric acid.
74 parts water.

The nitric acid passivates the metal to a large extent against action of sulphuric and muriatic acids. Temperatures generally used are 150 to 160 deg. F. After rinsing, the work should be passivated in 20 per cent actual HNO_3 for 30 min. at 150 deg. F. If the work is not passivated, much of it will not be stainless.

Inhibitors a Recent Development

Only within the last five or six years have efficient inhibitors been developed. These are organic compounds and usually have a nitrogen base. They are colloidally dispersed compounds carrying electric charges which form some sort of film over the bare cathodic metal and prevent attack of the acid on the metal but do not affect the attack on scale.

Some inhibitors now on the market reduce the action of acid on bare metal to less than 1 per cent of that obtained when no inhibitor is used, Mr. Thomas said. Tests of efficient inhibitors showed 91.48 per cent inhibition with 0.01 per cent of inhibitor (but decreasing rapidly with time) and 99.1 per cent inhibition with 0.025 per cent inhibitor.

Advantages of using inhibitors were reported by Mr. Thomas as follows:

Acid spray practically eliminated, thus improving working conditions and decreasing building and equipment deterioration.
Waste of metal is eliminated.
Pitting is prevented.
Life of bath is prolonged because less metal is dissolved.
Absorption of hydrogen in the metal, the cause of acid embrittlement, is largely eliminated.
Over-pickling or burning is prevented.
High-quality work without skilled workmen is insured.

During the discussion the point was brought out that, of the grease removers, metasilicate of soda was probably the most efficient, due to the fact that it gave an emulsion of oil particles surrounded by water films and prevented the formation of an oil scum at the top of the bath to contaminate the work.

SMALL PLANT OUTWITS DEPRESSION

By H. R. SIMONDS

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PRODUCTION has doubled each year, since 1928, in the plant of the Silent Glow Oil Burner Corpn., Hartford. The idea which has proved to be depression proof is an oil burner which converts a kitchen coal range into an oil stove. Mass production has been adopted and the process of manufacture involves some interesting operations.

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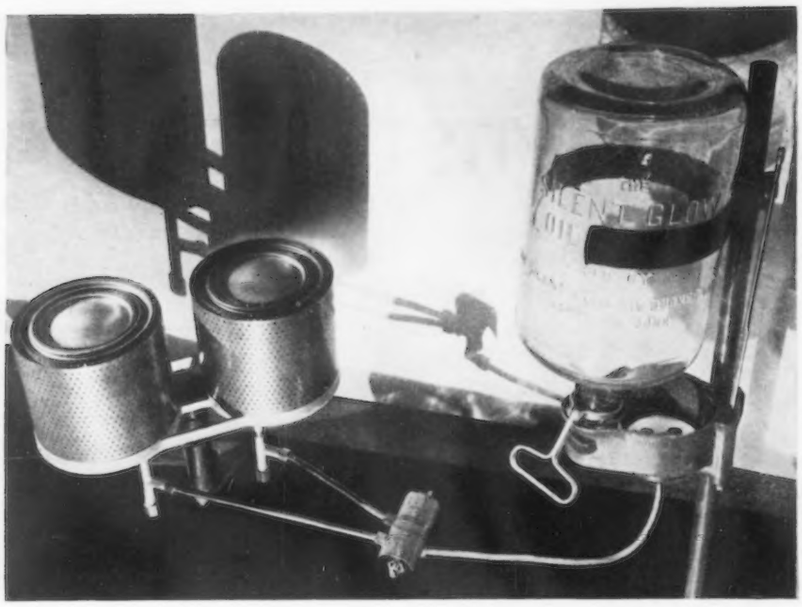
THAT the old-fashioned inefficient and slow-working kitchen range still exists in hundreds of thousands of American homes few people would question, yet it remained for the Silent Glow Oil Burner Corpn., Hartford, Conn., to see in this fact the means of developing a new product and thus paving the way for a successful industry. The problem which presented itself to the company management as it got a better picture of the typical rural housewife struggling through the summer months with a room-heating and yet slow-cooking coal or wood range, was how to salvage these ranges. People become accustomed, after long usage, to such an important piece of furniture as a kitchen range and it is with some reluctance even in the summer months that a householder would part with this well established household god.

Basing their argument on this fact and the additional fact that many features of the average range are valuable, the Silent Glow engineers set about to design an oil burner which would convert a kitchen range into an oil stove. The company, in fact, came into existence as the result of such a burner. It started manufacturing and selling range burners in 1924. The start was a modest one to be sure, but the idea "caught on" and larger quarters were soon needed. The first burner was of the blue flame vaporizing type, which had been on the market at that time for about a year. It met with fair success, but required considerable servicing and the company engineers turned their whole attention to making improvements. New models appeared almost every year until the company's model "W" was developed in 1928. This new type involves what is known as a superheating principle, which makes the burner start quickly and give an intense heat. Since 1928, when this new type of burner was placed on the market, the growth of the company has been remarkable. Sales have more than doubled each year and the factory has been moved to larger and larger quarters. It now occupies one unit consisting of three buildings previously occupied by the Hartford Rubber Works in Hartford and employs more than one hundred men in its factory. During the last few years the company has added many items to its first line and now is successfully producing and selling several types of oil burners for heating large buildings and power plants besides a small heating burner for households.

The manufacture of the range burner on a larger and larger scale has meant the adoption of mass production methods with modern equipment. Raw material for the various products is brought to the receiving room by truck, where it is checked, tested and put into bins to await the demands of the production department. One of the principal parts of

This shows an aisle in the power burner department of the Silent Glow plant.



The full equipment supplied for converting a range into an oil stove consists of a burner, an oil container and its standard and suitable piping, valves and fixtures.

the range burner is the burner shell, a perforated cylinder of high chrome steel. There are several of these shells to each standard range burner. After experimenting with many alloys, a chrome steel with about 20 per cent chrome was found to give the best service in operation. The material, however, was difficult to fabricate, and it took a good deal of further experimental work to develop a method of perforating on a commercial basis. Material for the shells is received in the form of strips in widths and thicknesses suited to the different types of burners. One of the most popular types of burner uses a strip 5⅛ in. wide and 0.029 in. thick. This comes in coils and is fed through a Henry & Wright high-speed punch which operates at the rate of 140 strokes a minute, with each stroke punching 152 holes. These holes are grouped in a space of 2¼ in. of the length of the strip, which means a production of more than 26 ft. of perforated strip a minute on one machine. This strip is cut into desired lengths on a self-indexing shears and the cylinders for the burner shells are made up by forming these lengths between rolls and then spot welding the lap joints.

The general construction of a typical burner is shown at left. The base into which the shells fit is a gray iron casting which is made under exacting specifications by a neighboring foundry, the Taylor & Fenn Foundry, Hartford. This casting has such a fine grained smooth finish that it is used without machining. The various other parts are nearly all stampings made in the stamping department of the Silent Glow company. Each burner is assembled by hand, the shells being held to the base by a snug fit. Slight variations in the casting are compensated for in the shell diameter by running one end of the shell when necessary through a set of squeezing rolls to slightly expand its diameter. The company's production at present is about 600 complete burners a day, and almost every part, including auxiliaries, is made in the company's plant.

Bright steel wire is used to make a type of bottle carrier designed as part of the burner equipment. The bottle serves as the fuel reservoir. Handles for the bottle are made in a wire forming machine which in one operation cuts off a length of wire and forms the complete handle with its semi-circular loops.

Nitrogen Assures Success in Etching for Strains

A METHOD of determining the internal strains in certain kinds of steel in which strain patterns were not heretofore visible has been developed by F. R. Hensel and C. W. MacGregor, research engineers for the Westinghouse Electric & Mfg. Co., East Pittsburgh. A steel member which has been stressed slightly beyond the limit of its elasticity will not return to its original shape after the load is removed. Such stressing of steel develops miniature flow lines on its outer surface. If this steel is cut into sections, additional flow lines on the cross-sections will be exposed.

It was discovered 10 years ago by A. Fry, a German physicist, that by etching these flow lines with a solution containing hydrochloric acid, the pattern of the strains in the metal is brought into sharp relief as a distinct black pattern, easily visible against the metallic white background of the unstrained portion. While this discovery was important to designers of steel structures and machinery, its usefulness was limited because only Bessemer steel could be successfully etched.

In seeking to extend the etching process to open-hearth steels, the Westinghouse engineers found that W. Koester, another German physicist, had traced the success of the etching process to the presence of nitrogen in the steel. Experiments indicated that nitrogen was the controlling element, and, furthermore, that it was beneficial only when it amounted to between 0.01 and 0.05 per cent. Tests of weld metal and Bessemer steel, whose nitrogen content is within these limits, verified these conclusions.

Further investigation evolved a method of nitriding these open-hearth steels so that, when they were etched, the flow lines and patterns of the strains within the steel would become visible. In this process the test specimen is first stressed and then cut into sections to be nitrided and etched. This etching reveals all the flow lines on all surfaces of the specimen. This stressing, cutting, nitriding and etching routine permits examination of the flow lines and strain patterns of steel members in practically every application, including the important application of shafts in torsion, and the examination of certain processed steels whose flow lines cannot be obtained by any other method.

In summing up the work, it was found that the requirements for successfully etching the strain patterns of steel members include a sharply defined yield point and that the steel must be stressed slightly beyond that yield point. It must have a nitrogen content between certain fixed limits; if it contains less than this amount of nitrogen, the deficiency must be made up by a nitriding process. Last of all, the material must be correctly etched.

Special Quality Steels for Shipbuilding

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A PAPER read in New York before the American Society of Naval Architects and Marine Engineers by William Bennett, senior surveyor, Lloyd's Register of Shipping, New York, directed attention to recent developments in steel manufacture for the purpose of assisting in the shipbuilding art. His discussion related to the use of alloy steels in general and high-tension steels in particular, in a number of representative ships. In the Lusitania and Mauretania, built about 25 years ago, high-tensile silicon steel was used for the strength deck and upper portion of the side plating over about two-thirds the length of each ship.

This steel had about 1.25 per cent silicon, giving a tensile strength of 34 to 38 gross tons a square inch, with a yield point of 20 tons. Some of the thinner plates, below ¾ in. thickness, were of high-carbon steel. Because of the strength of this material, a reduction of about 10 per cent in weight of scantlings was allowed where this was fitted.

Mild Steel with High Elastic Limit

Another ship, built in Scotland in 1925, the Prometheus, was of high-elastic-limit mild steel throughout the main structure. In this case the elastic properties of the material were emphasized, and again a reduction of about 10 per cent in weight of scantlings was allowed. This saved about 250 tons in the weight of the structure and made a corresponding gain in cargo-carrying capacity.

This steel was reported to have an elastic limit of 16 to 17 tons a square inch, compared with 8 tons for ordinary mild steel. Its tensile strength of 30 to 35 tons was not greatly higher than the 28 to 32 tons of mild steel. Elongation was reported at 20 per cent in 8 in. and the modulus of elasticity was 8 per cent higher than for mild steel. In cost it exceeded mild steel by 25 per cent.

How these high elastic properties may be obtained are stated as: through an increase in nickel, silicon, manganese or carbon; by a hardening and tempering treatment; by normalizing; or by temperature control during rolling, and particularly at the end of that operation. In this case care has to be taken that rolling is completed above a certain critical range of temperature, whereby a normalizing effect is produced without need of recourse to a special normalizing treatment.

Admiralty Steel

Steel which has been used in British warship construction since 1922 was reported as containing 0.33 per cent carbon, 1.1 to 1.4 per cent manganese, 0.12 per cent silicon, with sulphur and phosphorus between 0.03 and 0.04 per cent. This steel (Admiralty "D") is subject to a control of finishing temperature, giving a normalizing effect without the expense of a special heat treatment. For steel of this quality a finishing temperature of 830 to 860 deg. C. (1525 to 1580 deg. F.) is aimed at, this being slightly above the critical range.

This steel has an ultimate tensile strength between 37 and 43 tons a square inch and a proportional limit between 17 and 20 tons. Its specified elongation is 17 per cent in 8 in. and it must bend through 180 deg. around a bar with radius one and a half times the thickness of the test piece.

Stainless Steel Used for Fittings

A stainless chrome-nickel steel known as KA2, which is produced under the Krupp-Nirosta patents in several steel works in this country in basic electric furnaces, has been used to some extent. This is a high-grade chrome-nickel alloy, about 1 per cent heavier than ordinary mild steel. Physical tests on plates from ¼ to ⅜ in. thick showed for 12 tests an average of 84,000 lb. a square inch tensile strength, a yield point of 37,000 lb. and the high elongation of 55.7 per cent in 8 in. This steel is said to have a high proportional limit.

Its chemical analysis is: carbon, under 0.15 per cent; manganese, under 0.50 per cent; phosphorus and sulphur, under 0.025 per cent; silicon, under 0.75 per cent; chromium between 16.5 and 19.5 per cent and nickel between 7 and 10 per cent. This material has been used mainly for marine hardware and yacht trimmings, rather than for structural purposes. It is made in the form of castings, forgings and rolled sections and resists atmospheric corrosion.

Structural silicon steel made in open-hearth furnaces has a composition of about 0.44 per cent carbon, 0.18 per cent silicon, 0.063 per cent sulphur, and phosphorus 0.075 per cent when made in an acid furnace and 0.05 per cent in a basic furnace.

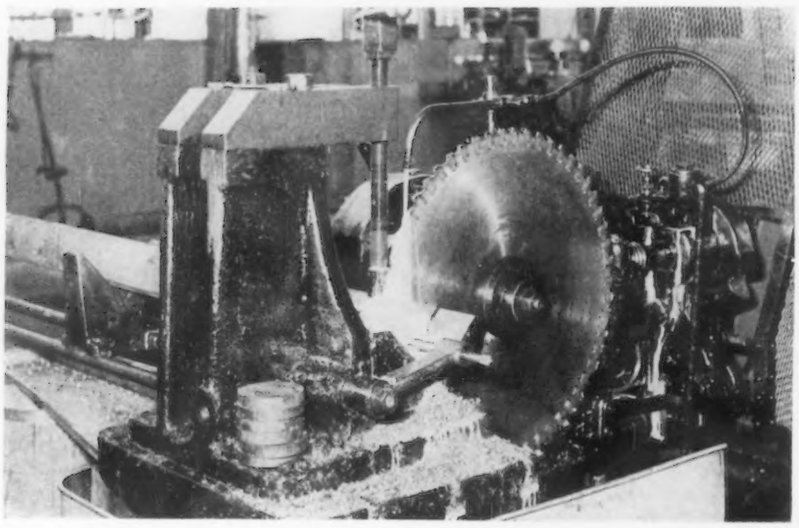
Average figures for tests on plates from ½ to ¾ in. thick, taken both longitudinally and transversely, gave an ultimate strength of 82,000 lb., yield point 46,000 lb., modulus of elasticity 29,300,000 lb., elongation 25.1 per cent in 8 in. and reduction of area 43.4 per cent.

Nickel Steel of High Tensile Properties

High-tensile nickel steel, not heat treated or normalized, depends for its physical characteristics on its composition and the special control of rolling. This steel contains not less than 2.75 per cent nickel, with 0.60 to 0.90 per cent manganese, not over

(*Concluded on advertising page* 28)

High Lights in Ball Bearings



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(AT LEFT)

THE start in the production of one type of bearing is a disk cut from a round steel bar. These disks are sawed from the bars by a semi-automatic circular metal saw. The bars must be straight to produce parallel sided disks.

This problem, however, has been put up to the steel mills and rejections are made if crooked bars are received. After sawing, the disks are trepanned and the small disks thus salvaged from the center are used in the production of smaller sized races.

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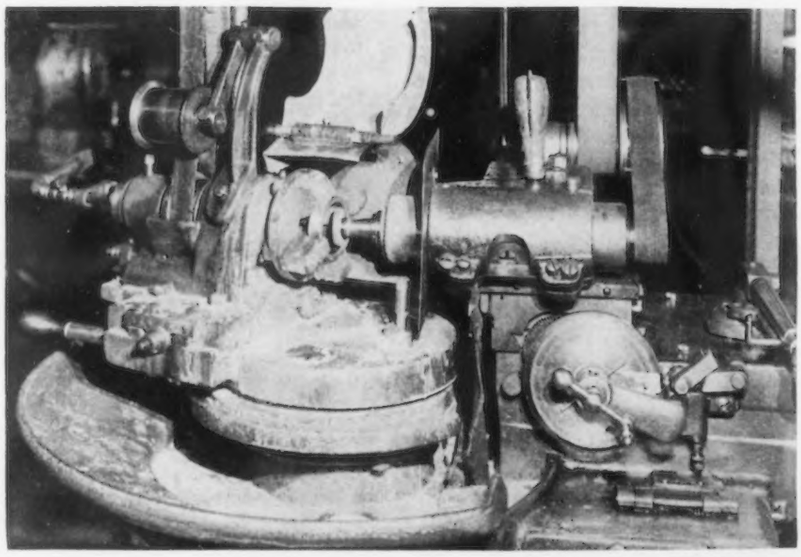
(AT RIGHT)

THE disk rings are rough ground, turned and bored with an allowance left for subsequent grinding. They are then heat treated after which the raceway of the outer ring is ground in the manner shown. The ring is mounted in a quick operating air chuck on the revolving head of a special radius grinder. The entire head rotates in a horizontal plane about the small grinding wheel to produce the desired contour of the raceway.



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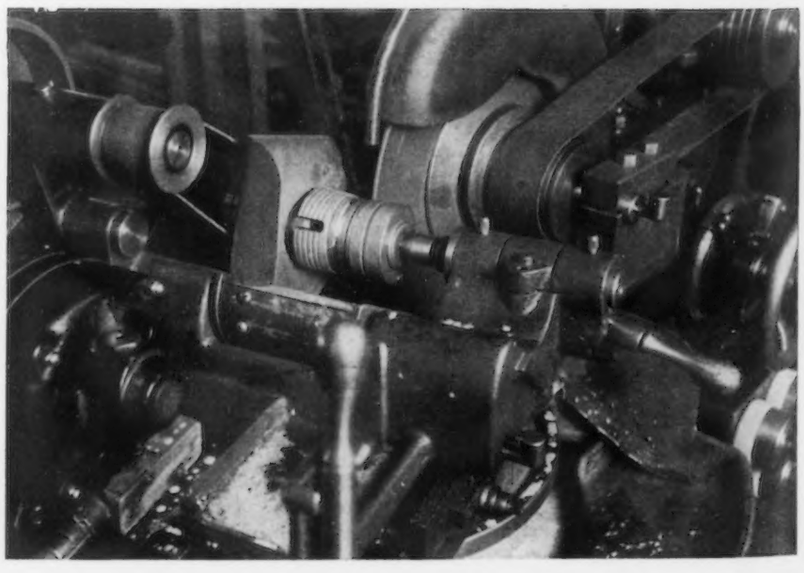
(AT RIGHT)

THE raceways of the inner rings are ground on another special radius machine which operates in a fashion similar to that of the outer ring raceway grinder. Each inner ring is mounted as shown on a revolving head and the whole head is then rotated in a horizontal plane about a large, thin, round-faced grinding wheel. After grinding, both the inner and outer raceways are checked as to contour and are then polished with formed wooden tools dipped in oil and coated with finely powdered abrasive.



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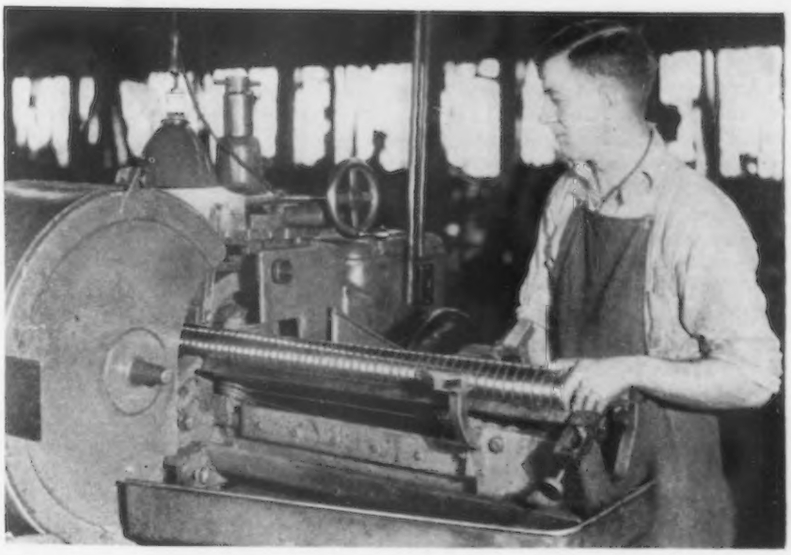
Production

THE trend in industry is toward the so-called frictionless bearing, by which is meant principally the ball bearing and the roller bearing. In 1910 the annual production of ball bearings was valued at approximately $5,000,000. In 1930 it had increased to about $100,000,000. As might be expected such a heavy increase has been accompanied by extensive developments in the method of manufacture. The accompanying illustrations give the high lights of one typical modern method of making radial ball bearings.



(BELOW)

THE hardened rings are returned to the large grinders for final surfacing. The sequence throughout this operation is; rough grind one side then turn pieces over and rough and finish grind the opposite side then return the pieces to the first position and finish grind the first side. After grinding the surfaces, the bore of the inner ring is ground on an automatic internal grinding machine. The outside diameter of the outer ring is ground on a centerless grinder.

(ABOVE)

TO avoid the possibility of strains set up in the thin, outer rings, these parts after finish grinding on centerless grinders are put away on shelves for an extended period of seasoning. During this seasoning slight changes in shape are apt to take place and such changes are corrected by taking a further slight finishing cut on a centerless grinder. It is highly important to avoid any possibility of vibration in this final delicate grinding. The result is a mirror like finish which requires no further polishing.

(CENTER)

BECAUSE of the accuracy of the fit between balls and races and the damages which might result from even small particles of dirt, much importance is attached to thorough cleaning. While the inner race is being revolved at high speed, oil is forced at high pressure through the bearing to remove all particles of dust and foreign matter. After washing and while still coated with oil each bearing is wrapped in wax paper and is then ready for shipping.

STRAIGHT-LINE METHODS AT FORD

SCATTERED throughout the United States are assembly plants of the Ford Motor Co. where cars are built from parts made at the Dearborn factories. The last word in progressive straight-line production, the Ford plant at New Orleans is typical of these modern assembling units. Enameling lines and drying ovens, features of special interest at that plant, are illustrated with this article.

Straight-line production begins at the railroad spur which divides into a "Y" at one end of the plant, the two branches running along opposite sides of the building. Parts are unloaded on a concrete platform at one side, and the finished automobiles are loaded directly into freight cars on the other side. Minor assembly lines start at the unloading dock and terminate at points on the main assembly line where the various sub-assemblies are incorporated.

Motors are completed in the first sub-assembly line. There the gear shift lever is applied, the timer regulated, the spark plugs, fan, fan belt and distributer installed and the lubrication system and general performance of the motor checked. Other sub-assembly lines are: steering post assembly, including wheel, horn cable, and tube; radiator assembly, including paint spraying, drying and testing; and the wheel and tire assembly and inflation.

Parts Are Assembled in Minor Assembly Lines

A number of minor assembly lines are devoted to enameling and finishing operations. The equipment comprises dip tanks and gas-fired ovens with traveling conveyors. The enameling process is continuous and automatic; parts are hung on to the conveyor at one end and removed at the discharge end with the enamel baked on and ready for service. There are, in all, one washing unit, burn-off oven and sander, as well as two dip tanks and bake ovens for two-coat work. The parts enameled include fenders, shields, aprons, hoods, running boards, brackets, etc.

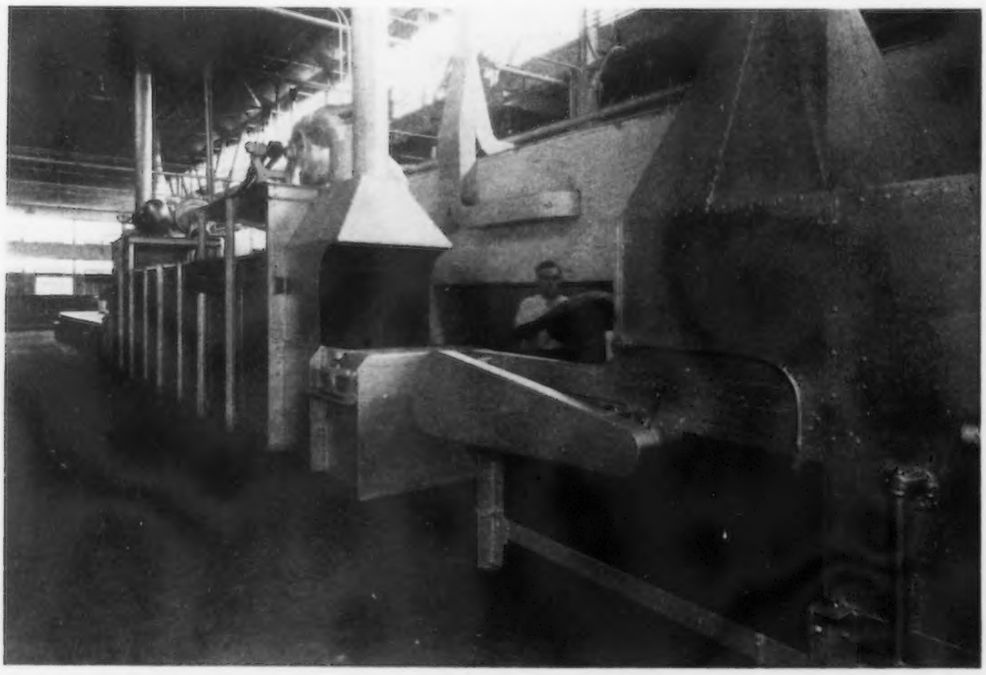
The washer is made of plate steel in box-type construction, 4 x 6 ft. in cross-section and 55 ft. long. It is provided with a conveyor of traveling slat type and tanks of soda solution and rinsing water heated by steam from a gas-fired boiler. The liquids are forced by pumps through spray jets on to the work as it passes through. The conveyor extends 5 ft. beyond one end of the washer to facilitate loading the work.

Six Gas Burners Heat Burn-Off Oven

After washing, the parts are dried in the burn-off oven. This is almost identical in shape and size with the washer; in place of the tanks, however, there is a series of six gas burners under the conveyor. Of the gas-air proportioning type, these burners employ a pressure firing system and are provided with a recording controller which automatically maintains a temperature of 750 deg. in the oven. The combustible mixture is turned on and off intermittently and mechanically as the temperature varies from the degree set on the controller. Waste products of combustion are removed by a fan exhaust at each end. Conveyors on both washer and oven are motor-operated, the speed of the latter being so regulated that the work remains in the oven 1 hr.

The parts then pass along on an open mechanical conveyor of the slat type, 45 ft. long. Operators on each side sand the surfaces in preparation for the enamel.

There are two enamel ovens, set side by side; each is 110 ft. long, 8 ft. wide, 10 ft. high, and equipped with an overhead chain loop conveyor, driven by a motor through a



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LEFT

OPERATOR receiving stock from delivery end of washer and passing it into burn-off oven, where it is prepared for enameling.

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RIGHT

GAS-FIRED oven heater with duct through which air is drawn from the delivery end of the enameling oven and forced back after reheating.

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PRODUCTION ASSEMBLY PLANT

By J. B. NEALEY

CONVEYORS, dip tanks and automatically controlled ovens facilitate the painting and enameling of Ford automobile parts. Far from being an intermittent process, each operation is virtually continuous and harmonizes with the straight-line assembly methods for which the Ford Motor Co. is noted.

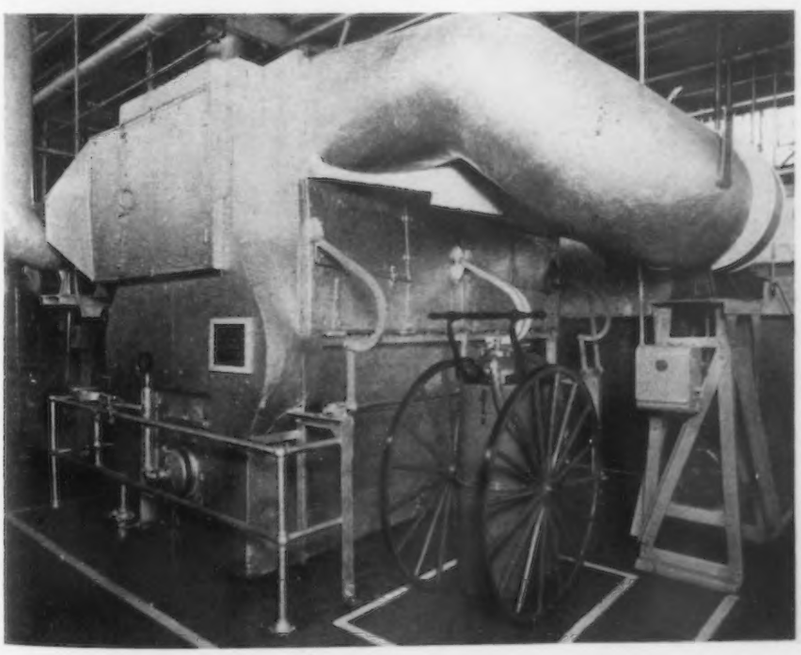
speed reduction mechanism. The ovens are constructed of sheet steel held together with structural shapes and well insulated. There is a fan exhaust at each end. A dip tank at the loading end of each oven holds the liquid japan. An operator dips the parts and hangs them on to the conveyor, which passes through the first oven. At the other end an operator removes the parts, dips them for the second coat and hangs them on to the conveyor of the second oven.

Enamel Baked in Two-Temperature Ovens

These ovens are heated indirectly, that is, air is heated in separate combustion chambers and forced into the ovens with fans. Each of these heaters is 16 ft. long, 8 ft. wide and 12 ft. high and contains 20 tubes. A single gas burner fires into the chamber and the hot products of combustion pass between the tubes and out through a vent to a stack, imparting most of the heat to the air within the tubes. This hot air is forced by fan through a filter and into the oven through a duct. Another fan draws air from the oven and returns it to the heater to be reheated; in this way, recirculation and uniformity of heat distribution is obtained. Some fresh air from the atmosphere is pulled into this system and mixed as needed.

A special feature of these ovens is that the charging ends are heated with steam coils, while the heat from the heaters is utilized in the remaining portions only. The reason for this is that too high a heat, applied just as the work comes out of the tanks, sets the japan before it has had a chance to drip and smooth out, leaving raised spots and streaks here and there. The low-heat portion, where the steam coils are located, occupies not quite a fourth of the oven. The duct from the air heater enters near the center of the oven and the heat is pulled toward the unloading end by the fan suction induced in the exhaust duct through which the spent hot air is returned to the heater.

The temperatures in the low-heat and high-heat sections of the ovens are separately controlled by automatic means. Steam supplied by the gas-fired boiler is maintained at a constant degree at the boiler. The correct temperature in the high-heat portion of the oven is regulated by the amount of cold fresh air admitted into the recirculation system, and this in turn is controlled by a damper in the admitting flue. If the temperature of the oven should rise suddenly, or the current to the fan motors or conveyor motors fail for any reason, a magnetic valve in the gas supply line immediately operates to shut off the gas to the burner. A temperature of 525 deg. F. is employed for baking on japan or enamel, the baking period being 1¾ hr.



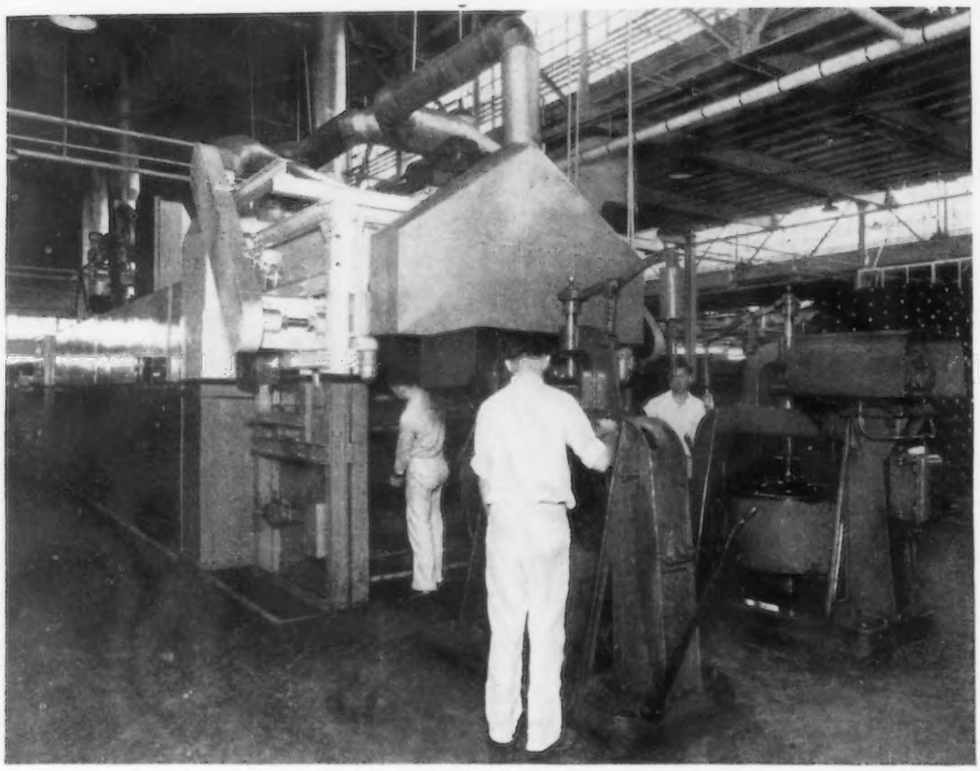
Wheels Are Spun to Remove Excess Paint

For japanning the wheels, a single dip tank and oven unit is used. Here the operator simply transfers the wheels from an unloading dock conveyor to the paint machines, where they are dipped, spun to remove excess paint by centrifugal force, and then placed on a conveyor and moved through the oven. This oven conveyor is similar to the one already described; it is motor-driven through a speed-reduction mechanism. The wheel oven itself, which is 60 ft. long and 10 ft. square in cross-section, is similar to the larger enameling ovens in design and method of operation.

Fire protection for the tanks of japan consists of tanks of Foamite that are suspended overhead by chains with fusible links at key points. Should fire occur, the links melt and release Foamite spray directly on to the tanks. The japan is baked on at 320 deg. F. for 1 hr., 20 min.

How the Car Bodies Are Painted and Dried

There are three main assembly lines, two for pleasure cars and one for trucks; these extend nearly the entire length of the building on the side next the loading dock and parallel



LEFT

WHEELS are dipped by special machines that spin off the excess paint; a wheel drying oven is located near these units.

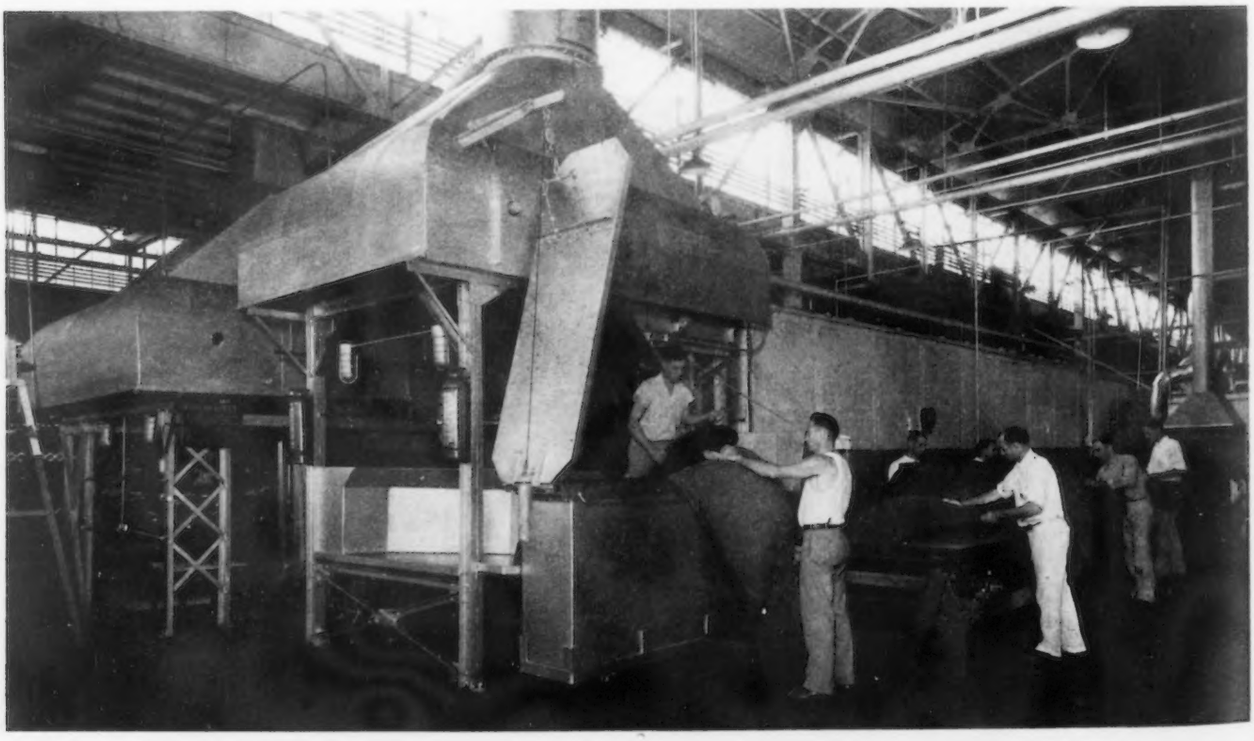
BELOW

FENDERS and other parts are dipped in japan, then charged into the baking oven. The exit-end of burn-off oven, for drying the parts after washing, may be seen at the extreme right.

to it. Adjacent and parallel to these are several lines for assembly, painting and trimming of the bodies; eight drying ovens are required for this work. Paint spray booths are located at the charging ends of these ovens, the paint drying as the bodies pass through the ovens. One of these lines is for colors and has four spray booths in a row.

The ovens are of sheet steel, large enough for a car body to pass through and ranging in length from 40 to 200 ft. Each is equipped with a motor-driven, slat-type conveyor and the first and second-coat ovens are heated with steam coils. Bodies remain in the first-coat ovens for 2½ hr. at 225 deg. F., while the second coat requires only 1½ hr. at 150 deg. F. Drying in the other ovens is accomplished simply by circulating fresh air through them. The body parts are made at Dearborn, but the bodies are put together at the assembly plant.

Steam for the various ovens, as well as for heating during the winter months, is supplied from two 100-hp. boilers, each heated by two gas burners. Gas is supplied at 60 lb. pressure in the lines, is reduced to 18 lb. and finally to approximately 2½ or 3 lb. at the burners.



First All-Metal Office Building

Walls Are of Aluminum, Frame of Structural Steel and Floors of Steel Plate

THE first all-metal office building to be erected in this country was recently completed in Richmond, Va. The structure, which is the new home of the Department of Public Works, is two stories in height, rectangular in shape, with a frontage of 116 ft. and a depth of 50 ft.

Walls of Aluminum

The inner and outer walls of the building are fabricated from aluminum. In the outer walls, plate and extruded shapes are used, the latter being employed to produce a drop-panel effect in the pilasters and entablature and give the building a firm architectural character. The inner walls are formed from sheet, with insulating material pumped into the intervening space between the outer and inner walls.

Steel casement windows extend from the first floor level to the base of the entablature and form a continuous line between the pilaster columns. The spandrel areas of the windows are backed with aluminum sheet and insulated in a similar manner to that employed elsewhere in the walls.

A pleasing contrast in color and texture is obtained on the exterior of the building by giving the pilasters and entablature a sand blasted finish, and the light metal trim on the windows and between the window frames and pilasters, a satin finish. To accentuate this contrast even further, the window frames are painted black except in the spandrel sections; here, both the window panes and frames are painted with aluminum paint.

The partitions on the first and second floors are of satin-finished aluminum sheet over wooden frames. The permanent partitions at the entrance extend to the ceiling while those between the structural bays extend only to within 3 ft. of the ceiling, thus providing better ventilation for the offices. The ceilings are of plaster applied on metal lath; the floor covering of ⅛-in. asphaltic tile.

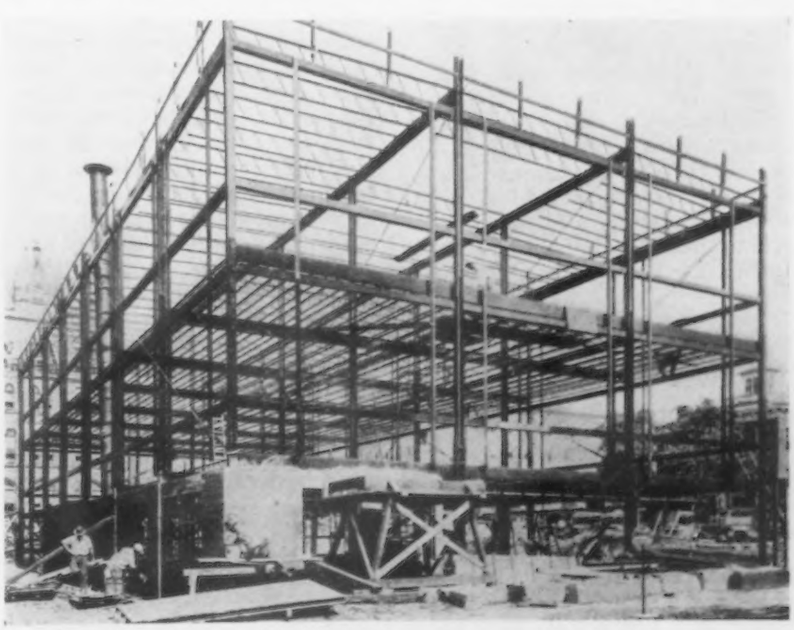
The entire structure is assembled on a structural steel framework. Its weight was materially reduced by the use of aluminum curtain walls and steel floor and roof decking. Below the first floor level, the columns consist of 8 x 8-in. 31-lb. H-sections; above this point, of 6 x 6-in. 20-lb. H-sections. Twelve-inch channels and I-beams are employed for the floor girders and 10-in. channels and I-beams for the roof girders; both the floor and roof girders extend in one direction only. Each structural bay is 16 ft. 6 in. by 16 ft. 8 in. The concrete footings, upon which the columns rest, are 4½ ft. square and extend to compacted clay gravel only 18 in. below the basement floor level.

Lattice-type joists, bolted at the top and bottom to the structural girders, are used for both the floor and roof beams; while formed steel plate, attached to the joists by means of bolts, serves as the floor and roof decking. The roof is covered with five-ply slag roofing on insulated boards cemented to the steel decking; the floor with 3 in. of gypsum, poured in place and unreinforced. As constructed, the floors have a live load of 80 lb. per sq. ft. and a dead load of 20 lb. per sq. ft.; the roof is designed for a live load of 30 lb. per sq. ft. and a dead load of 15 lb.

In the new building the façades are from 3½ to 7 in. thick; they, together with the insulating material, average less than 10 lb. to the sq. ft. The basement walls of concrete offer a good comparison; these are 10 in. thick and weigh approximately 120 lb. per sq. ft. Tests on double metal walls of the type used in this structure have shown that the 3½-in. walls have the equivalent insulating value of 48-in. brick walls.

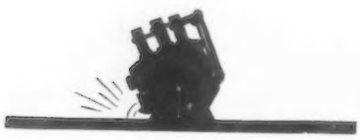
Only four and one-half months were required for the completion of the building. The structure has a cubical content of 222,244 cu. ft. and, without such accessories as partitions, floor coverings, window shades and the like, cost 19.1c. per cu. ft.; with accessories, it cost 22c. per cu. ft.

The plans for the building were prepared in the Department of Public Works, of which Col. R. Keith Compton is director, by the Bureau of Surveys and Design. W. A. Childrey, assistant engineer of the bureau, designed the details of construction and coordinated the work of the several sub-contractors, the Department of Public Works acting as its own general contractor.



The elimination of tons of dead weight in the construction of the floors and walls made possible a material reduction in column and girder size.

MONEY SAVING IDEAS



Uses Furnace Wash Heat

THE "pick up" of residue from one heat to another in an electric furnace is sometimes sufficient to effect the composition of the alloy in the succeeding change. A metallurgist has overcome this by taking a wash heat of gray iron or steel between alloy heats. The wash heat is not wasted but is used for flasks and other useful castings. Another method of offsetting the effect of residue in the lining of a furnace is to schedule the sequence of alloys to take advantage of the presence of residual metals.

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Two Furnaces for Economy

IN a modern high production sequence nothing must be allowed to interfere with the forward flow from raw stock to finished material. One operator having several normalizing operations in his sequence has found economy in the added expense of installing a furnace for each operation in order to avoid a switch back in the production line.

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$100 Saves $1200 in Refractories

BECAUSE the front wall was dangerously thin, an open hearth superintendent found he must soon take off a certain furnace. The roof was worn so thin that it would collapse if cooled down sufficiently to make the repair. There were enough orders on the books for 75 heats. To avoid the expense of starting another furnace for a short run, he built up the door jambs nearly to the arches, using a chrome ore preparation. When it crumbled, he rebuilt it, until finally it withstood the high heat as well as the seasoned refractories. The furnace was continued for 125 additional heats, saving roughly $1,200 in refractory costs.

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Polished Spring Leaves

A RECENT news cable from London contained the statement that steel leaf springs such as used in automobiles may be materially increased in strength if the separate leaves are machined and polished before being assembled into the complete spring. Authorities here commented cautiously on this item. Machining and polishing may remove minute cracks or surface defects, but such an advantage might well be lost after the springs have been in service for a short time. Machining and polishing will tend to reduce friction of one leaf over another and thus better distribute the loads. Also by eliminating high spots a more even bearing may be secured and concentration of stresses thus avoided. Some manufacturers of leaf springs already do machine and polish each leaf, but the more common practice is to use forgings without machining.

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Standardized Skids Save Handling

AN auto parts manufacturer has reduced his shipping department costs materially by cooperating with his customers in the mutual use of standardized steel skid boxes and lift trucks. The completed products of his plant are put in the skid boxes direct from the final inspection and are not disturbed thereafter until they reach the benches of the assembly departments of his customers. The skid boxes are returned empty but this additional cost is more than offset by the saving in handling time. One man with a lift truck loads a freight car in an average of 15 min. at his plant. Widely separated manufacturing units of one company find standardized skid boxes particularly adaptable to their problems.

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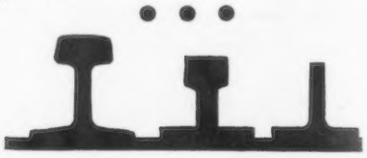

Re-Rolled Rails for Furniture

A STEEL furniture manufacturer is successfully re-rolling old railroad rails for the angles and bars required for furniture braces and supports. The re-rolled shapes are high in carbon and have been found excellently adapted to the severe strain to which the braces are subjected. The rails are electric street railroad rails bought at scrap prices.

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Uses New Bearing Metal

BEARING metal which works against one kind of steel may not work so well against another. One engine manufacturer uses for a crankshaft bearing a metal composed of 70 per cent copper and 30 per cent lead and reports much better operating results with this than with the usual babbitt metal. It gives less friction, melts at a higher temperature and has a longer life. The crankshaft is a carburized S. A. E. 2512 steel.

FOR WORKS MANAGERS

Revolving Tables Speed Welding

WELDING, either with electric or oxyacetylene welders, is an important means of salvage at many foundries and machine shops. At one plant special enclosures have been provided for this work. Each operator works on half of a revolving table while parts to be welded are being arranged for him on the opposite half. In this way the change from one job to the next is made with a minimum of lost time to the welder. The enclosures are without tops and the walls are 2 ft. off the floor to permit free circulation of air.

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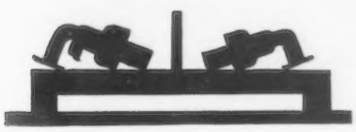

New Benches Help Chippers

INCREASED output in chipping castings has been secured at a jobbing foundry by providing a new type of bench. This is made of concrete with wood block surface and stands 3 ft., 3 in. high. It is double width with a partition along the center. The chippers stand on one side and put the castings over the partition as they finish them. The castings are then inspected on the other side of the partition. Conveyors at a distance of 3 ft. on each side of bench provide means of transportation.

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Bonus for Close Work

IN the cleaning room of a large foundry oxy-acetylene torch operators are paid on a tonnage basis with a double set of premiums or bonuses. The first premium is based on a saving of gas, each torch being metered. The second premium is based inversely on the amount of metal removed by the grinder in the succeeding operations. In other words, the closer the burn-off man can come to the specified dimensions the less grinding will be required and the more pay will he get. The management divides the saving equally with the operator.

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Better Vision for Grinders

SWING frame snagging grinders are usually designed with the grinding wheels parallel to the frame which means that the operator works with a back and forward motion. One shop superintendent, noticing that this design keeps the wheel in the line of vision between operator and work, has tried placing the wheel at right angles to the frame and has immediately found several advantages for that construction. The operator works with a side to side motion which is said to be less tiring. He has a better view, saving time and metal by concentrating at a desired point.

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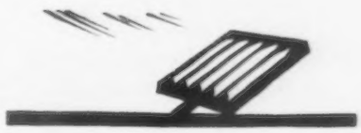
Reveals Minute Cracks

CRACKS in forgings and castings are often difficult to locate. Yet on important work even a tiny crack may be cause for a rejection. One manufacturer has found that chromium plating of finished machine parts makes visible minute cracks and defects which otherwise escape all but the closest inspection and for certain classes of work for this reason only, he has specified that all parts shall be chromium plated before final inspection.



Jigs Used for Inspection

INSPECTION costs in a quality product plant are often high and yet these are apt to be overlooked in the usual economy campaign. A cutlery shop has been able to reduce its inspection costs by 50 per cent by using jig racks into which groups of about 100 blades are placed for inspection. The edges of the blades are first carefully alined and then the light from a mercury vapor lamp is reflected from the group as a whole. Experience has shown that even slight imperfections show up immediately under this inspection. The imperfect blades are removed as detected and the group is then again inspected after which the accepted blades go to the shipping department.

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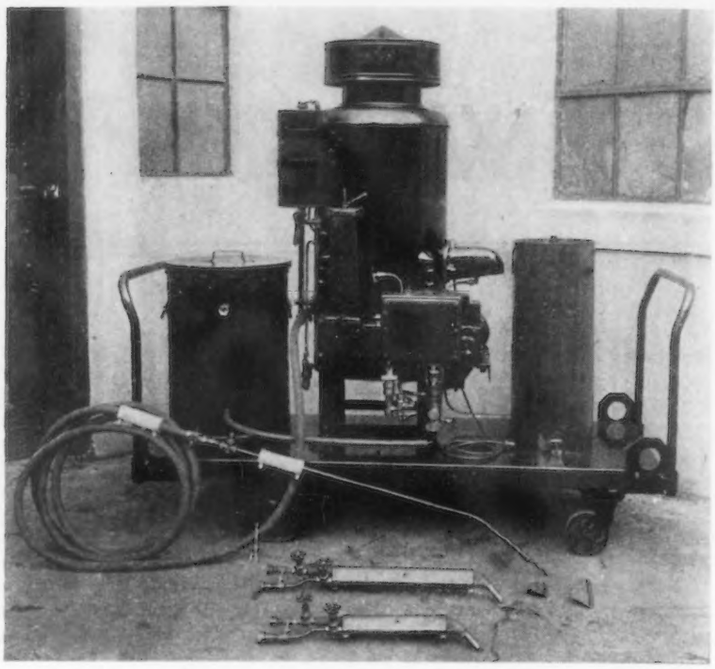
Heating Furnaces Set Low

THE usual method of installing a cylindrical or basket type of hardening furnace, such as the Homo furnace, is to place it on the floor of the hardening room. With the average size of furnace this brings the top at a height of about 5 ft. which is awkward for loading and unloading. Wherever possible it is much more convenient to set the furnace down in the hardening room floor and one metallurgist after considerable experimenting has found the most convenient arrangement is to have the top of the furnace 2½ ft. above the floor. Truck platforms are built at this same level and the baskets containing the furnace charge are then easily swung over and lowered into place with a chain block or even with simple tackle.

Self-Contained Portable Vapor Spray Unit Facilitates Factory Cleaning



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A HOT-WATER vapor generator for use in wet cleaning of factory interiors and exteriors, including windows, walls, floors and ceilings, machinery and other operating equipment is being marketed by the Homestead Valve Mfg. Co., Coraopolis, Pa., under the trade name of "Hypressure Jenny." Paint removal, disinfecting and deodorizing are among other uses for the device, which, compared with the usual hand scrubbing process, is claimed to make possible marked savings in time, labor, and cleaning materials, especially in the cleaning of surfaces exposed to oil and grease.

The device is self-contained and is mounted on a four-wheel truck so that it can be moved easily to wherever its service is required. It is controlled automatically throughout and may be operated by ordinary shop labor.

Solution mixing tank, water vapor generator and dual fuel and water pumps are major components of the device. Water for the mixing tank is taken from the nearest shop supply outlet, overflow being prevented by a water level float valve. Cleaning compound is introduced into the water at the mixing tank and the mixture is pumped through heating coils which produce a hot vapor spray under pressure, this being accomplished without the aid of external or nozzle blending. A constant flow of hot vapor at 150 lb. pressure is delivered when using a 3/16-in. flat or round nozzle, and vapor at 120 lb. pressure when using a ¼-in. nozzle. With nozzle orifices still further restricted, dual cleaning lines may be operated simultaneously. The 150-lb. pressure is said to generate in from 6 to 10 min., and then maintained mechanically during machine operation.

The water vapor generator consists of a gravity-feed kerosene pilot burner, a pressure-feed main burner, which is mechanically controlled, and water and fuel pumps. The equipment has neither steam drums nor evaporating drums. The dual fuel and water pumps are arranged to function as metering devices, delivering the exact amount of fuel needed to heat a given flow of water, so that the temperature of the fluid in the heating coils will be such as to produce uniform saturation of vapor at the nozzle of the machine. When protection of the heating coils against lime and other chemical deposits is required, the unit can be furnished with a Zeolite type water softener.

Either a fractional horsepower electric motor or a gasoline engine is used to drive the dual pumps. The drive is through reduction gearing and the arrangement is such that the pumps may be started and stopped without stopping the motor. There are no pump governors or pressure control valves.

Operation of the device, which is controlled entirely at the nozzle, is simple, and ample safety devices have been provided. In removing paint by this process, either of two methods may be used: A cleaning solution may be put through the machine or a chemical paint remover may be brushed on the painted surface and the surface then cleaned and neutralized by water vapor from the machine. Large areas of ribbed glass windows, walls, ceilings, wood block and checker plate flooring are said to be cleaned more thoroughly and with marked savings in time over hand scrubbing, like results being obtainable in cleaning the surfaces of tanks and vats, paint spray booths and painting equipment, transmissions, bearings, gear sets, heavy machinery, cranes, locomotive and other transportation equipment. It is stated that in some cases the reduction in cleaning time has been as much as 90 per cent as compared with hand scrubbing.

Electrode for Welding Sheet and Cast Aluminum

FOR the welding of sheet and cast aluminum, the Lincoln Electric Co., Cleveland, has introduced a new electrode known as "Aluminweld.' This electrode is a 5 per cent silicon aluminum alloy, and is designed for either metallic or carbon arc welding. It is provided with a coating which prevents excessive oxidation and will dissolve any aluminum oxide that might be formed. It is claimed that the coating assists in giving the smooth operating arc essential in welding aluminum, and that the resulting weld is dense without porosity and possesses high tensile strength. It can be polished satisfactorily with practically no discoloration, so it is claimed.

In using this electrode a short arc of approximately 20 volts should be held, with the coating practically in contact with the work. Current to be used will vary with the thickness of sheet or material to be welded; with a 3/32-in. electrode, the current ranges from 35 to 45 amp., and with a 3/16-in. electrode it ranges from 100 to 150 amp. With the metallic arc process reversed polarity is used.

The Aluminweld electrode is made in four sizes, 3/32, ⅛, 5/32 and 3/16 in., in 14-in. lengths.

New Lathe for Short Work Is Speedy, Flexible and Automatic

Seneca Falls Product May Be Operated Also as a Semi-Automatic Machine

A NOTABLE machine, brought out primarily for machining short stubby work, such as ball-bearing races, gear blanks, including bevel gears, and, in short, pieces that can be held either on an arbor or in a chuck, has been added to its line by the Seneca Falls Machine Co., Seneca Falls, N. Y. It is a new model K Lo-swing lathe that may be operated as a semi-automatic or, when equipped with loading device, as a totally automatic machine.

Six and one-half inch diameter tool bars extend through the machine and carry the tool supports at the outer end. In addition, tool-actuating means is provided by shafts which extend through the tool bars and operate tool slides when desired. Feed for the tool mechanism is obtained through cams which, through arms, impart a rocking movement to the tool bars. If it is necessary to take an angular cut, as in machining bevel gears (such as is shown in the end view of the machine), the tool bar may be rocked into position, where it is securely held, and then by the additional feeding mechanism the tool slides can be advanced at the desired angle and rate of feed.

While all feeding movements are obtained by the use of cams, the control mechanism for throwing the machine into and out of rapid traverse, and for opening and closing the chuck, returning the tool slides, etc., is hydraulically operated. The use of hydraulics in this connection is found to simplify the construction and make for longer life. The motor is mounted at the rear of the machine, as is the coolant pump, which is individually motor driven.

Pick-off gears are provided for feed, rapid traverse and spindle speed. Such an arrangement for rapid traverse makes for great flexibility in securing the fastest possible time for a given character of machining.

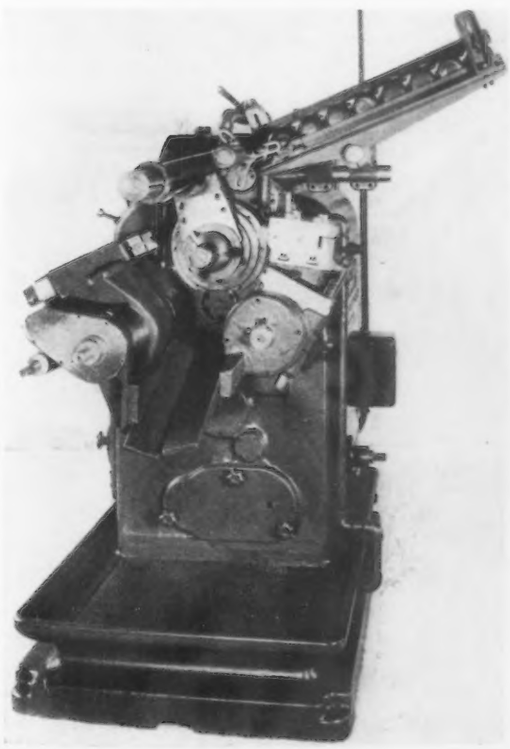
The machine as illustrated is shown equipped with the automatic loading device. The parts to be machined are for roller bearing races. The loader puts each blank on a stub arbor, where it is held while being machined. After the race has been completed, it is ejected from the stub arbor hydraulically. The entire loader is operated hydraulically, and safety features are incorporated to protect the machine in case of accident.

A feature lies in caring for the chips. A chip truck placed against the machine receives the chips directly; it is removed when full without loss of time and an empty truck rolled into place. Just before the piece being machined is completed, two flat bars are brought together to form a V-chute, as shown in one of the pictures, which chute allows the completed part to slide by gravity through an opening in the end of the chip truck and thence into a tote box or other receptacle that can be placed against the chip truck for that purpose. The hole delivering the completed piece may be seen over the wheel of the chip truck.

The machine may be furnished without the loaders as a hand operated machine, or it may be equipped with any of a number of other automatic loading arrangements which the Seneca Falls Machine Co. has been developing. When equipped for hand loading, the machine is started by pressing a lever, after which it will go through a complete cycle and then stop. When equipped with automatic loading, the cycle is continuous.

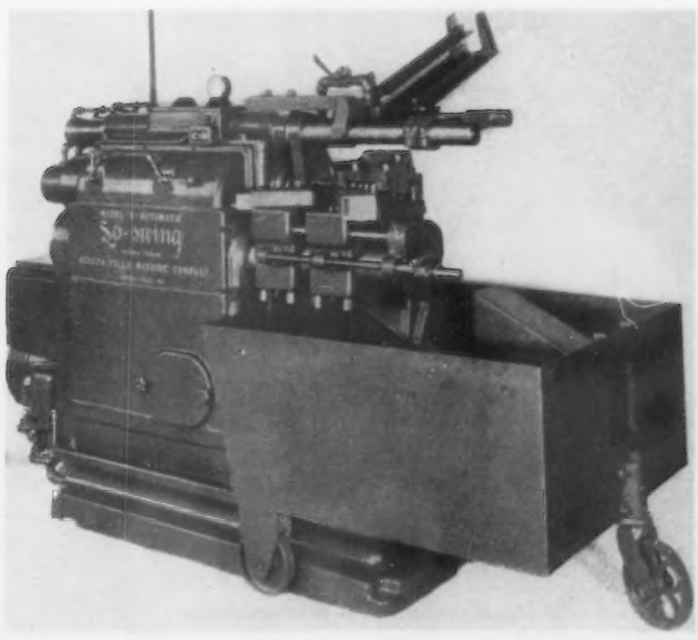
Considerable attention has been given to reducing change-over time to a minimum. The machine shown here is arranged to take races from 15/16 to 5 in. in diameter. Three of them in operation at the Hyatt Roller Bearing plant are reported giving thoroughly satisfactory results.

As indicated in the illustrations, the new Lo-swing machine is of notably heavy design, weighing approximately 8700 lb., and it is built for speeds as high as 2000 r.p.m. for the spindle. Anti-friction bearings are used throughout and all shafts and gears that are subjected to any amount of wear are hardened, thus to secure long life and low maintenance cost.

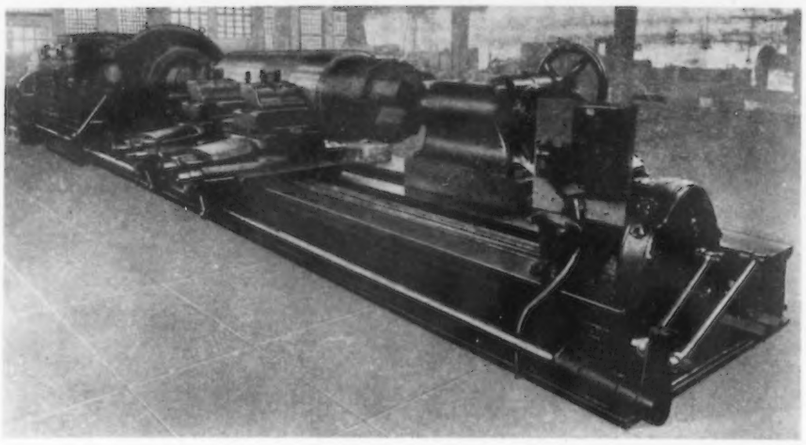


HEAVY tool bars extend through the machine and carry tool supports at the outer ends, including slides for machining bevel gears. (Left.)

Chips, separated from the work, fall into the readily removable chip truck, and the finished piece slides through the hole shown above the truck wheel into a suitable receptacle. (Below.)



Roll Lathe Designed to Use Hard Alloy Tools



INTRODUCTION of tungsten-carbide alloy and special steels has brought about the design of a lathe for the turning of rolls in which cutting speeds can be greatly increased and higher rates of feed are possible. This is the case particularly where chilled rolls or any other rolls of extreme hardness are being machined.

The accompanying illustration shows a roll lathe of this new type in operation at the Garrison plant of Mackintosh-Hemphill Co., Pittsburgh. Unusual capacity is featured, the machine being designed to provide the high speed, power, strength and rigidity necessary to enable use of tungsten-carbide or other high-speed cutting tools to the limit of their capabilities. Chilled iron roll bodies of 58-61 Sclerescope hardness are being turned with this lathe at the rate of 30 r.p.m. cutting speed, ⅛ in. depth of cuts, with 3/16 in. longitudinal feed. The Mackintosh-Hemphill Co. has acquired the exclusive rights to manufacture and market these lathes in the United States.

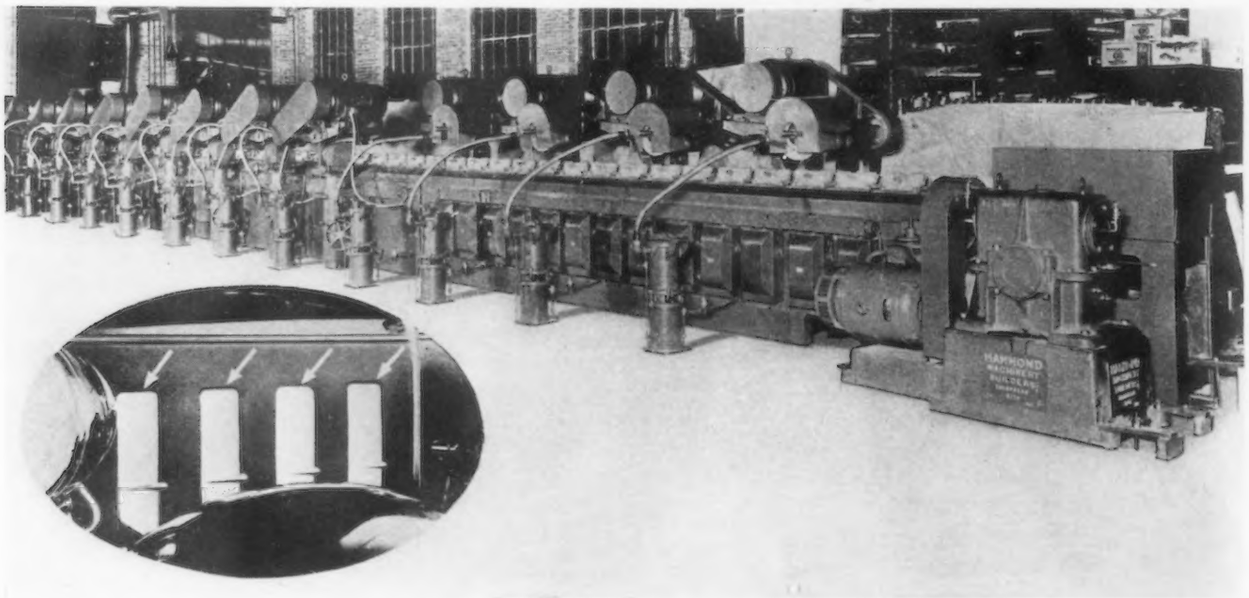
Builds 12-Head Straight-Line Automatic Polisher and Buffer

IN polishing and buffing the top and inside edge of the hinge of the 4 x 12-in. ventilator doors used on the hoods of a prominent make of automobile, the 12-head machine here shown finishes 900 pieces an hour. Both the top and part of the inside edge of the hinge are processed in one pass through the machine.

Any work not requiring a rotating fixture can be processed on this type of machine, which is the Strait-Line automatic polisher and buffer recently added to the line of the Hammond Machinery Builders, Kalamazoo, Mich. The work can be set at any position between horizontal and vertical. Because of the self-contained unit construction, machines of any width or length or having any number of wheels can be furnished.

To the caterpillar-type conveyor unit employed is largely attributed the speed and work finish obtained. This conveyor is made up of heavy cast-iron platens that are carefully machined and are so alined that any type of fixture or adapter may be attached. This construction also permits side as well as top polishing. Platens are mounted on hardened rollers, are chain driven and run on continuous rails. When equipped with the company's variable-speed multi-V belt drive, the speed of the conveyor may be varied conveniently to suit conditions. Movement of the platens in all cases is smooth and steady.

Each polishing and buffing head on this 12-head machine is motor-driven through multiple V belts. Spindle speeds can be varied either by changing the regular pulleys or by means



The top and inside edge of ventilator doors on automobile hoods are polished and buffed at the rate of 900 pieces an hour in one pass through this straight-line machine.

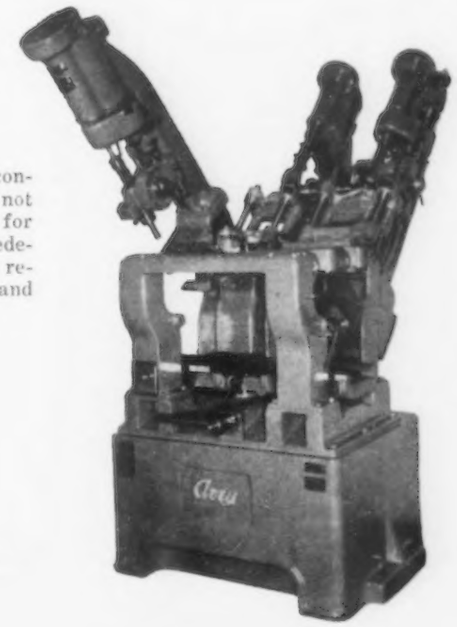
of the Hammond special variable-speed pulley, which permits increase to any speed 50 per cent above the low.

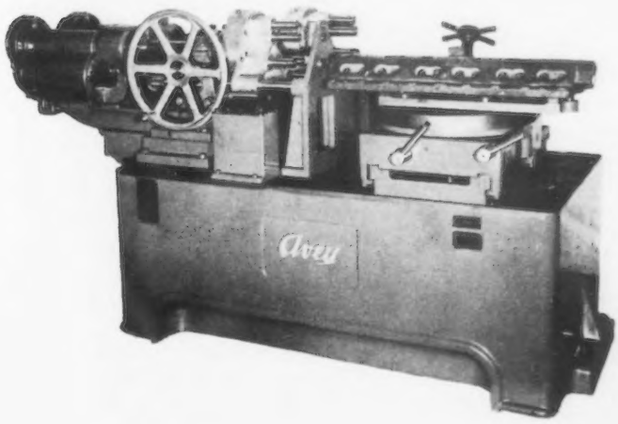
Each spindle has an oscillating movement which may be thrown in or out of operation by means of a lever on the outside of the housing. Each head is mounted on universal knuckles and is supported by a vertical column which can be raised or lowered. In addition, there is a tilting adjustment that permits moving of the wheel from the vertical to the horizontal position. Both spring and weight balance controls provide for any predetermined pressure or "yield" for polishing and buffing.

The company's automatic composition feeders, described at length in THE IRON AGE of Sept. 17, 1931, are employed on this machine, the accompanying illustration showing 12 of the feeder cylinders with flexible hose leading to the various wheels. Advantages of this feed device include economy of polishing composition, saving in time and labor of application and cleanliness. They are operated by compressed air and deliver the paste through distributing nozzles directly to the polishing or buffing wheels. Centrifugal force of the wheel carries the composition, in turn, to a fabric collector pad clamped to one side of the nozzle. This pad presses against the face of the wheel, applying a definitely controlled film of composition. The discharge spout of the feeding nozzle is adjustable for wheels of flat, curved or irregular contours, as well as for width of face. Method of feed, intermittent or continuous, as well as quantity of feed, is under the operator's control.

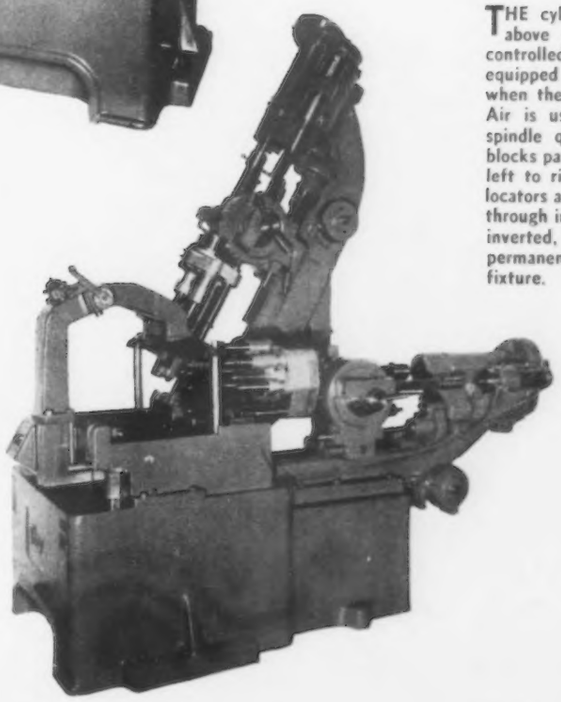
Special Machines Built Up From Standard Drilling and Tapping Units

ALTHOUGH special in character, the drilling and tapping machines here pictured—built by the Avey Drilling Machine Co., Cincinnati, for operations on automotive cylinder blocks and head liners—employ motor-driven units of standard design. With such standard unit construction the entire machine does not become obsolete in case the part for which it was built should be redesigned; the standard units may be reset or they may be dismantled and reassembled for other work.





THE cylinder-block machines, shown above and at left, are electrically controlled from the front and are equipped with a tell-tale light to show when the tools have cleared the work. Air is used as a booster to provide spindle quick advance. The cylinder blocks pass through the machines, from left to right, on rollers. Disappearing locators are used when the block comes through in its normal position, but when inverted, the block is raised on to permanent locators at the top of the fixture.



THE above machine drills and taps water connection holes in both ends of straight-eight and 12-cylinder V-type heads. The front unit drills and the rear unit taps, the holding fixtures being provided with both sliding and rotary movements. The extra spindles of the multiple heads are used for cylinder heads having holes located differently from those of the head shown on the machine.

Stud Making Attachment for Landis Machine

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THE stud attachment developed by the Landis Machine Co., Waynesboro, Pa., for its ¾-in. automatic forming and threading machine is said to give the machine a production rating of 200 to 500 per cent as a stud machine. This high rating is attributed to the fact that the loading (and unloading), pointing and threading operations are performed simultaneously at three separate stations.

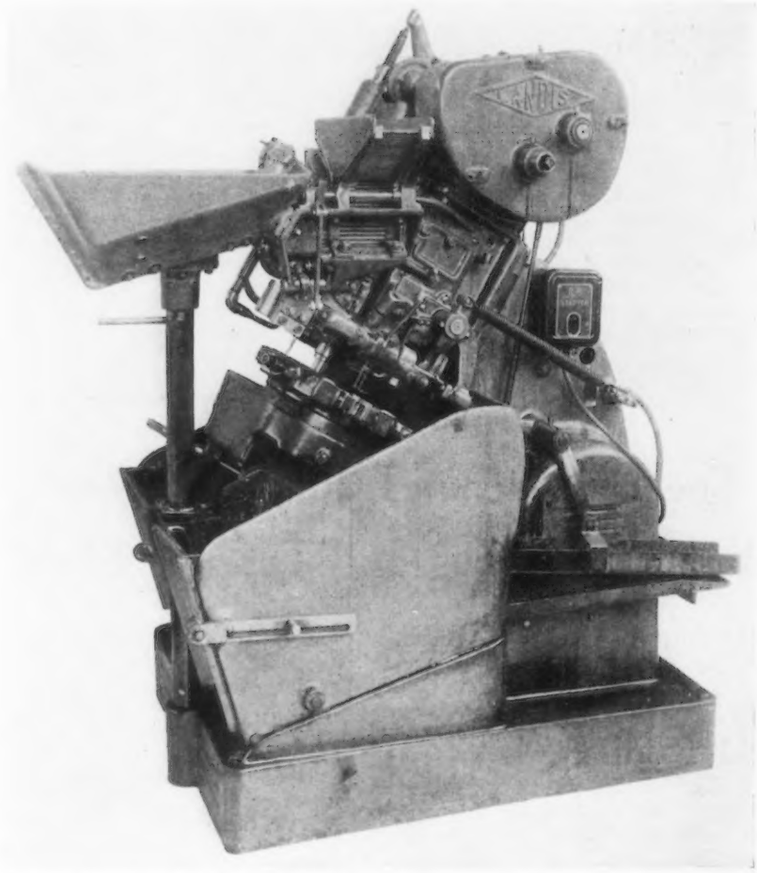
Another feature of the attachment is its ability to handle sheared blanks, which in saving material and eliminating the more expensive cutting-off operations, is emphasized as further reducing manufacturing costs.

The attachment consists of a hopper and a magazine. An agitator located at the base of the hopper insures an orderly and uninterrupted flow of the blanks to the magazine. From the magazine the blanks are fed, one at a time, to a slot through which they drop into an auxiliary magazine, which is a sectoral chamber that positions the blanks for transfer to the loading station of the turret.

For the second operation, the semi-finished studs are stacked in the hopper with their blank ends at the front of the hopper. The front wall of the hopper is hinged and can be dropped to facilitate loading.

The pointing head takes care of any variations in the lengths of the blanks and insures studs of uniform length. It will also point blanks of uniform length with minimum amount of waste.

The attachment is self-contained and can be applied quickly to machines in service. It is adjustable and will accommodate studs from ¼ to ¾ in. in diameter, from 1½ to 6 in. in length and a 2½ in. maximum thread length. The unthreaded section of the stud cannot be less than 75 per cent of the diameter.



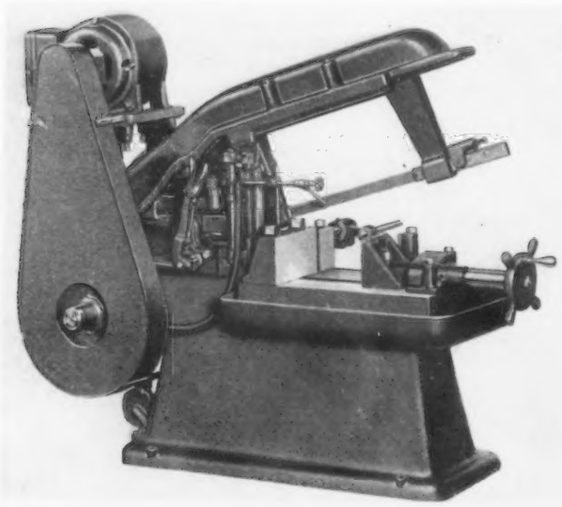
Sheared blanks are handled by the stud attachment applied to this automatic forming and threading machine.

High-Speed Metal Saw Provided With Two Speeds

THE 10 x 10-in. capacity high-speed metal sawing machine recently introduced by the Peerless Machine Co., Racine, Wis., is regularly equipped to provide two speeds, 90 strokes a minute for tool steels, etc., and 140 strokes a minute for machine steels.

Standard equipment also includes a motor stand built integral with the machine, the arrangement being such that the machine may be driven by belt from the lineshaft or by motor and V-belt. Either a full swivel vise or plain straight cut-off arrangement is provided for. Feed pressure changes are made by a graduated scale arrangement operated by a dial which indicates the pressure in pounds.

A clutch is provided within the drive pulley, so that when the cutting operation is completed the saw frame and saw rises from the work and stops. Positive automatic lift of the saw blade on the non-cutting stroke is provided, and regardless of how much feed pressure is being used there is no drag. Located at the rear, the pump for forcing the cutting compound is easily accessible.



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TOOL steels may be cut at 90 strokes a minute and machine steels at 140 strokes. The saw blade lifts automatically on the non-cutting stroke, and lifts clear of the work when the cut is completed.

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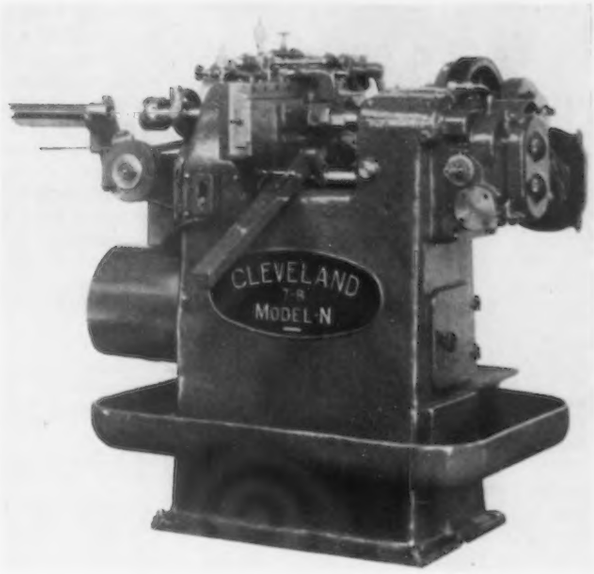
Shipments of electric industrial trucks and tractors in January totaled 29 units, against 22 in December, according to the Bureau of the Census.

Simplicity Features Machine for Manufacturing Nuts From the Bar



Tool adjustments and change-over to produce nuts of a different size may be made quickly.

THE Cleveland Automatic Machine Co., 2269 Ashland Road, Cleveland, has brought out a machine particularly adapted to the manufacture of nuts from the bar. Simplicity of design permits not only quick adjustment of tools after regrinding, but rapid change to different size nuts.

To assure rigidity and permanent alinement, the work and drill spindle heads are cast integral with the bed. All spindles and revolving shafts are mounted on anti-friction bearings.

The conventional method of feeding the stock by means of a feed-shell has been replaced by a feeding finger which is carried in the stock tube and is attached to a wire cable fastened to a friction disk geared to and operated by the chuck operating yoke. As the chuck is opened a pawl engages a ratchet tooth on the friction disk advancing the stock to the gage stop, which is advanced to the gaging position as the stock moves forward, permitting the friction to slip and moves back as the chuck is closed. The gage stop arm carries a guide bushing which supports the drill, insuring concentricity between the hole in the nut and the outside diameter.

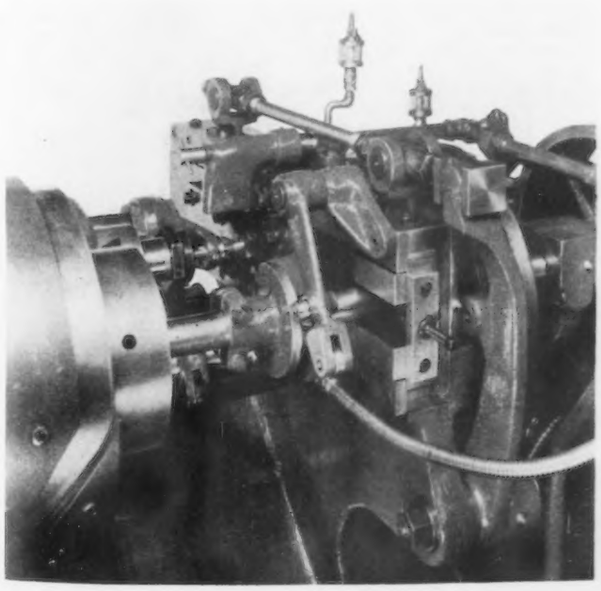
The hardened steel bushing supporting the drill is removable to accommodate different size drills. The drill spindle sleeve is moved back and forth by cams mounted on the operating drum; it carries the revolving spindle which is mounted on anti-friction bearings and gear driven with change gears to vary the r.p.m. of the drill.

Made of an alloy steel forging, the work spindle is mounted on anti-friction bearings having adjustment to compensate for wear. Change gears provide a full range of spindle speeds.

The cross-slides are carried on an elevation block, that is cast integral with the bed and is at right angles to the work spindle. The slides are independently controlled by a lever fulcrumed from the bed of the machine and operated by a disk cam carried on the camshaft. Independent adjustment of each slide facilitates setting up and maintaining sizes. Change gears provide a wide range of feeds.

Nuts are separated from the chips by a chute, which is cammed into position to catch the nut as it is cut off the bar and moves out as the nut drops, permitting it to fall into a separate container. Both product and chips can be removed from the machine while it is in operation.

The machine is motor driven and provided with two push button stations, one for starting or stopping the machine. The second push button station is mounted at the stock feed end of the machine and is operated by a pin attached to the stock feeding finger, which makes contact with the button, stopping the machine as the last nut on the bar is fed.



STOCK feed is by means of a finger carried in the stock tube and attached to a cable fastened to a friction disk operated by the chuck operating yoke. The gage stop arm carries a guide bushing that supports the drill.

Watch Size Tape-Rule Has Tempered Blade

A SMALLER and lighter tape-rule designated as the Crescent Junior is being made by the Lufkin Rule Co., Saginaw, Mich., in 4 and 6-ft. lengths. It is of pocket size and as in the company's larger tape-rule the blade is manually withdrawn and returned automatically by pressing a button at the side.

The blade is 7/16 in. wide and is made of tempered steel and stiffened by special forming. It can be projected unsupported into walls or openings like the usual rule and can be used also to measure circles and odd shapes. To facilitate reading, the blade, which is graduated in sixteenths, is made with a dark background and markings in sharp contrast. The case is chromium plated. The 4-ft. tape rule weighs only 3 oz. and its case measures 1¾ in.

Vertical Washer Operated by One Attendant

THE improved Solvent washing machine brought out by the Rex Products & Mfg. Co., Detroit, is a short-coupled vertical machine designed for use where floor space is limited, or where a one-operator machine is desired. The operator places the dirty work upon the conveyor, or fixtures, and then removes the clean work as it is returned to him.

Perm-A-Clor cleaning solvent, which is non-explosive and non-inflammable, and is said to be permanent in quality and acid free in both liquid and vapor form, is used in the machine illustrated. Work placed upon the conveyor at the right of the machine passes downward into the washer between streams of boiling solvent which strike the work from all directions at a pressure of 35 lb. per sq. in. The work and conveyor then pass over and upward, permitting the work to drain, and then through a rinse of distilled, hot solvent, after which it passes upward and leaves the machine, clean and dry. The work may be removed from the conveyor at the left of the washer or pass under the machine and return to the operator for removal.

When the solvent in the pumping chamber has become contaminated with the oil and foreign matter, the flow-back pipe from the rinsing chamber is shut and the distilled solvent is drawn off into a reserve tank until all of the solvent in the pumping chamber has been distilled or evaporated, leaving only a sludge and the accumulation of dirt in the pumping chamber. The dirt and oil are then cleaned out of the machine, the pumping chamber being made accessible by the removal of a single plate. After the cleaning, the plate is again fastened in place and the clean distilled solvent is drained back into the pumping chamber from the rinse and reserve tanks. The machine is then ready for operation with clean solvent. This method of cleaning, together with the condensers at the openings of the machine, is emphasized as keeping the loss of solvent at a minimum.

The process is most suitable for cleaning zinc or lead coated metals, aluminum die castings or soft metals which are affected by ordinary alkali cleaners, as well as removing lubricating oils from machined, stamped or quenched parts, or buffing compounds, before painting, lacquering, enameling, plating, vitreous enameling or other surface coatings. The machines may be adapted for any particular kind or class of work or cleaning.

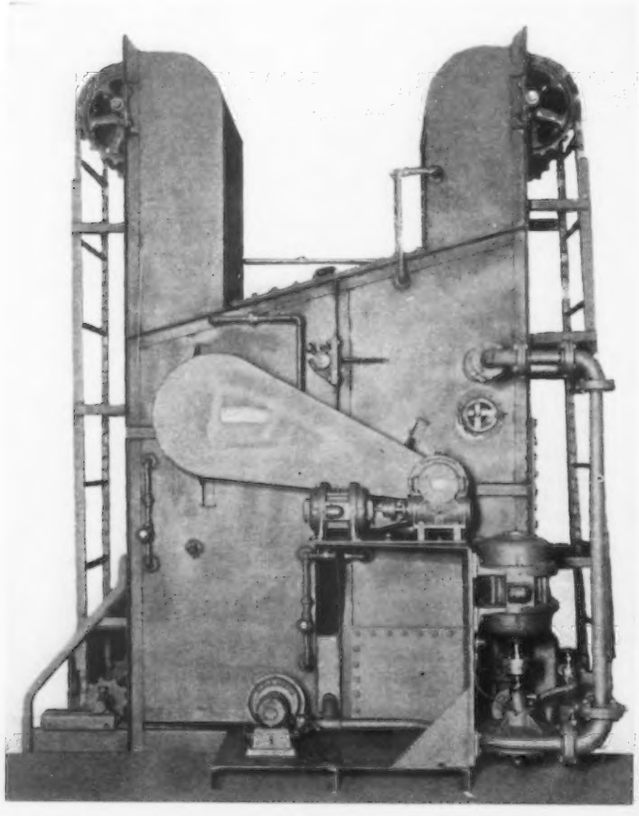
Foot-Operated Screw Driver and Nut Setter

A FOOT-OPERATED electric unit in both bench and pedestal styles has been added to the standard screw driving and nut setting machine line made by the R. G. Haskins Co., 4636 West Fulton Street, Chicago. With foot-pedal operation, both of the operator's hands are free to assemble the work brought to the machine.

The frame is a substantial casting and incloses the counterbalance weight. As shown in the illustration of the bench style unit, the frame provides two liberal bearings for the vertically sliding seamless tube shaft that carries the screw driving unit. The latter is attached to the vertical shaft by means of a cast aluminum bracket that terminates in a split clamping ring surrounding the motor casing. Accessible stop collars provide means for conveniently regulating the vertical stroke. The entire assembly is arranged to assure minimum fatigue in operating the machine.

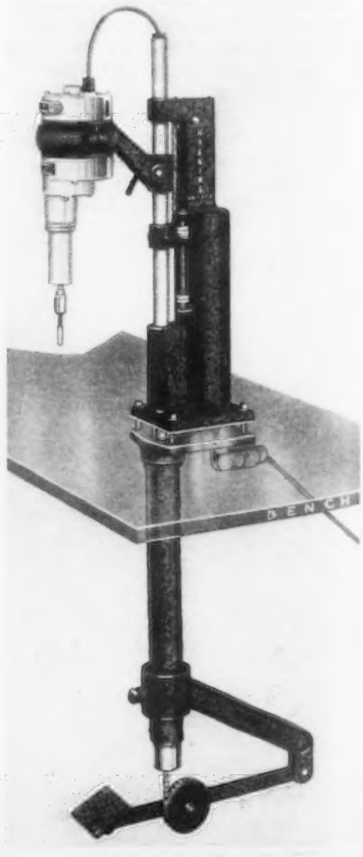
The foot-treadle is a self-contained unit and does not require fastening to the floor, the four machine bolts that secure the frame to the bench serving also to hold the foot-treadle bracket. The bracket can be adjusted to suit benches of different heights, and the treadle can be quickly located and locked to best meet operating conditions and the comfort of the worker.

The base of the pedestal style machine is similar to that of the tapping machine described in THE IRON AGE of Dec. 31, 1931. The adjustable table permits the driving of small machine screws and applying nuts in work varying widely in height.



AFTER passing through the vertical washer, the work is either returned to the operator at the loading position at the right of the machine, or is unloaded at the left of the washer.

WITH foot pedal operation, both of the operators' hands are free to assemble the work brought to the screw driving and nut setting machine at the right.



Congress May Put "Teeth" in Trade Conference Rules

Hearings Now Being Held in Washington on Senator Nye's Bills—Objections to Federal Industrial Courts

WASHINGTON, March 1.—Legislation to legalize trade practice conferences looking to elimination of unfair competition in all probability will be pressed for passage at the present session of Congress.

This was indicated following hearings on Wednesday, Thursday and Friday of last week before a subcommittee of the Senate Committee on Judiciary on three bills introduced by Senator Nye of North Dakota. Witnesses representing many trade associations and industries appeared in favor of the measures. The hearings are to be resumed for the taking of further testimony. As yet no opposition has been made to the principles of the bills, though it is clear they will be greatly modified and perhaps consolidated into one bill before brought before the Senate. The subcommittee consists of Senator Hastings of Delaware, chairman, Senator Austin of Connecticut and Senator Bratton of New Mexico.

Briefly the bills would (1) legalize trade practice conferences of the Federal Trade Commission; (2) set up a Federal trade court with branches throughout the country to handle all anti-trust cases and enforce trade practices approved by the commission and (3) define certain types of practices that would be illegal.

Provision for Federal Trade Courts May Be Eliminated

Questions propounded by members of the subcommittee gave the impression that the bill to set up a Federal trade court would be disregarded because of its cost and growing objection to creating additional Government bodies. On his own initiative, Senator Nye struck out a clause in one of the bills making it illegal to sell below cost, "as a trade incentive or for the purpose of injuring a competitor." The point has been made that it would be difficult to determine costs despite the provision that they would be ascertained in "accordance with the best accounting practice in the trade or in accordance with any basis or method prescribed by the Federal Trade Commission."

It is likely also either revision or elimination will be made of the clause making it illegal "to discriminate in price between different purchasers of commodities, not including discrimination in price on account of difference in grade, quality or quantity of the commodity sold, or that makes due allowance for difference in the cost of selling or transportation, or discrimination in price in the same or different communities made in good faith to meet competition."

The selling-below-cost and price discrimination clauses are taken from the Clayton anti-trust act and revised to give greater clarity and definiteness. There also was considerable objection, especially from Senator Bratton, to the clause making it illegal "to violate any rule adopted at a trade practice conference by the industry of which he is a member." A number of witnesses shared the view of Senator Bratton that this clause made a trade practice conference binding upon non-participants and that they should not be compelled to accept the practices unless they choose to do so. Other witnesses felt that unless an entire industry is compelled to adhere to the rules their effect is largely nullified. It was contended that it is the minority rather than the majority of an industry which engages in unfair methods of competition. On the other hand, those opposing the clause said that the legal force and public opinion back of approved practices would tend to their adoption by complete industries. They also questioned the power of the Government to compel adherence to rules by non-participants in conferences and also said the idea of such Government control in itself is distasteful.

Questions Raised as to Legality

Another provision which likely will be modified is one which makes approval of practices by the commission "conclusive" evidence of their legality. A number of witnesses concurred in the view of Senator Bratton that this would "foreclose" the authority of the Department of Justice against any action should it hold the practices to be illegal.

Abram F. Meyers, a former member of the commission, who represents a number of trade associations, including the Solid Steel Window Section Association, suggested that approval of practices be accepted as prima facie evidence of their legality. He proposed that industries operating under approved practices be granted immunity from the anti-trust laws so long as they had not been held illegal, but that they be discontinued in the event the Department of Justice should give notice that it considers them to be illegal. Other witnesses proposed a modification of this or similar kind.

R. B. Thomas, counsel for the American Institute of Steel Construction, told the subcommittee that the structural steel fabricating industry is interested in trade practice rules because they retain the identity of small fabricators. The suggestion fits in with the motive which Senator Nye said inspired him to introduce the bills. He said they are designed to protect the small independent manufacturers and merchants from the larger units, though Senator Bratton expressed the view they would have the opposite effect in some respects.

Mr. Thomas declared that one of the greatest evils of the fabricating industry is the extension of credit by the larger interests. The tendency, he said, is for a local manufacturer in times of low ebb of business to consolidate into larger units. These matters, he pointed out, were covered in trade practice rules originally adopted by the fabricating industry. Under the rules as finally revised by the commission, however, it was declared the industry is uncertain as to what it can do. Particular reference was made to the original rule providing that discrimination in price between purchasers is an unfair method of competition. With others, Mr. Thomas felt that removing this clause from the proposed legislation deprived it of one of its most essential features.

Mr. Thomas said that the structural steel fabricating industry feels it should be protected in the right to enter into certain agreements. He suggested that industries whose rules had been approved by the commission be granted immunity from prosecution during the period of their operation, but that the Department of Justice be empowered to enjoin continuance of objectionable practices. Other witnesses suggested that the Department of Justice should advise in advance if a practice proposed is illegal.

In discussing the clause making selling below cost an unfair method of competition, Senator Austin said that by establishing the cost of production as a minimum the manufacturer having the lowest cost would have or soon develop a monopoly of the trade. Before agreeing to its elimination, Senator Nye said the clause was aimed to prevent large companies gaining a monopoly by forcing small independent interests out of business through under-cost sales.

Benjamin Schwartz, New York, director general of the Institute of Scrap Iron and Steel, will testify this week.

SOUND RECOVERY DEPENDS ON

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THE feverish excitement of two weeks ago has cooled down and the public is ready to view financial policies more sanely. It is therefore timely to review the financial foundations of sound recovery and the part which Federal Reserve policy may play in creating those foundations.

The way has been paved to a further stage in financial policy. The Reconstruction Finance Corporation and the Glass-Steagall bill have paved the way by reducing bank failures, with consequent removal of the panicky feeling in the community, and by alleviating the fear of foreign withdrawals of gold from the United States. In two previous articles in THE IRON AGE I have endeavored to appraise the significance of these two financial measures. The appraisal has discountenanced the glowing interpretation of the measures painted by most of the newspapers and the political authorities. The appraisal nevertheless has found a residuum of constructive value in both measures. This constructive aspect is drab and prosaic, but, within limits, genuinely important. It now furnishes the background for further constructive steps.

Already the public has begun to anticipate the nature of the next financial move. The public expects important developments in the open market policies of the Federal Reserve System. Various newspaper writers have intimated that "large-scale purchases of Governments" will promptly be undertaken. Some of these news stories may be inspired, but, for the most part, they are deductions arrived at by the writers by piecing together shreds of information here and there. At any rate, open market policy is rapidly becoming the talk of the layman. The conjectures of correspondents on this technical subject are becoming front page news for the press. The mysteries of open market policy are being popularized.

The Nightmare of the Extremists

A group of extremists seems to be in a nightmare of agitation over any and all steps by financial authorities to assist the processes of recovery. To them the very suggestion of open market purchases of Government bonds is anathema. To everything suggested they cry "inflation." For their own part, they advocate a continuation of deflation along so-called

THE relief measures passed by Congress will not bring a magical upturn in business, according to Doctor Edie. But they have paved the way for gradual recovery. Much depends on Federal Reserve policy.

Open market purchases of Government securities should be limited to an amount sufficient to prevent further shrinkage of member bank reserves. Several months should be allowed for the task of overcoming the inertia of deflation.

Pitfalls to be avoided, the author says, are the hitching of Federal Reserve policy to the Wall Street kite or making money cheap for the mere convenience of Treasury financing.

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natural lines—whatever they may mean. What these extremists fail to see is that their very extremism is the most powerful force tending to build up a reversion on the part of the public to inflation. Extremism in one direction begets later extremism in the opposite direction. The sure-fire inflationists are, in a sense, the bitter-end deflationists.

According to the view of the present writer there is room for a vigorous credit policy which cannot, with any justification, be termed inflationary. Whether such a policy is what the officials have in mind to accomplish is a question which cannot yet be answered. The point which should be unmistakably clear is that one can support a vigorous Federal Reserve policy without being in favor of inflation.

Some People Expect Magic

Some people seem to expect an abrupt overnight change in the whole face of the economic outlook as a result of open market policy. The newspapers are largely responsible for this expectation of magic. This expectation is misleading. The laying of the foundations of sound recovery is a gradual process extending over a period of many months. It is not a revolutionary gesture; it is not to be judged by the events of a fortnight.

The momentum of deflation and depression is very great. For two years it has cut through every obstacle set up to arrest its course. To overcome this momentum is a slow process. Recovery is not to be thought of as a turning point, but as a broad turning base extending over a period of six to 12 months. Sound financial policy can be instrumental in effecting this kind of turn.

The Phlegmatic Viewpoint

Many of the most intelligent bankers and industrialists take the viewpoint that industry has to start first. After industry has begun to pull out of depression, then, according to their viewpoint, financial aid can be of some value. Before such a stage has been reached, these people insist that financial measures are of no avail.

This point of view is an attempt to be thoroughly realistic and pragmatic. People have been fooled so often during the last two years that they do not want to be fooled again by false financial starts. Nevertheless, it seems to the writer that this hard and fast line of cleavage between which starts first, industry or finance, is unsatisfactory. Financial institutions possess the advantage of centralized organization and, therefore, the possibility of centralized leadership. If these institutions give up the idea of working magic, and simply attempt, in a gradual, orderly manner, to set the financial house in order, their action can be expected by the most cautious realist to aid and assist the turnabout in industry itself.

The Misplaced Emphasis on Currency

During recent months public discussion of financial problems has tended to place overwhelming emphasis upon currency and to ignore the importance of credit. In the American banking system roughly nine-tenths of all transactions are completed by the use of checks drawn on demand deposits, but only about one-tenth by the use of currency. The process of deflation has taken place almost entirely through the channel of contracting bank credit. An endeavor now to develop a constructive financial policy must concern itself largely with an arresting of this shrinkage of bank credit. The currency problem is de-

ON CONSERVATIVE RESERVE POLICY

By DR. LIONEL D. EDIE

cidedly secondary in importance, although, in the popular eye, it seems to have transcended all other factors.

In order to visualize the credit factor it is necessary to compare the fluctuations in credit with the fluctuations in commodity prices. The accompanying chart affords such a comparison. As a measure of bank credit the chart employs demand deposits. As any statistician knows, this is only one of several possible measures of bank credit, but it is singled out for special attention here because, over a significant period of time, demand deposits have held an important relationship to the movements in commodity prices.

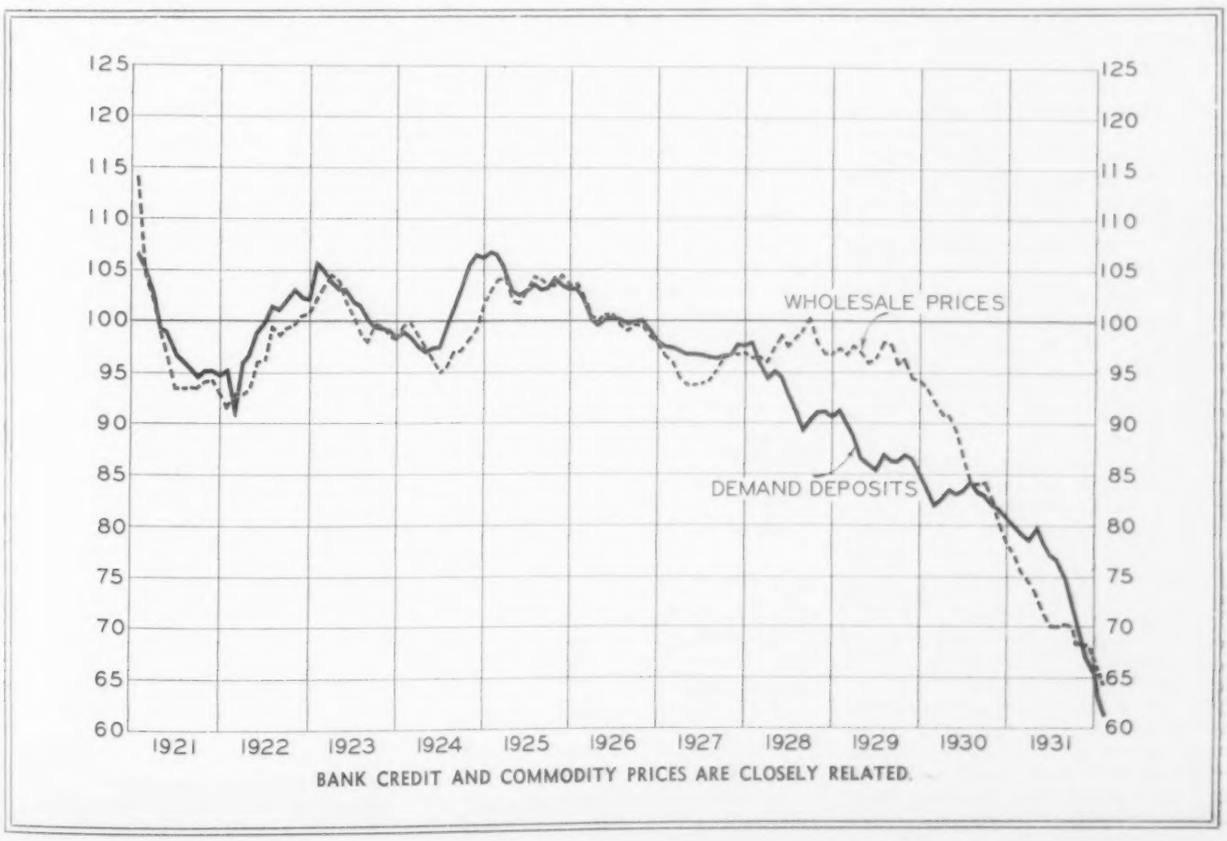
The demand deposits curve relates to the deposits of weekly reporting member banks outside New York City. New York City institutions are excluded because of their dependence upon speculative transactions in the Wall Street area. The only adjustment of the figures is for long-term trend of growth. The commodity price curve is based upon the monthly wholesale average published by the United States Bureau of Labor Statistics.

The fact that a statistical correspondence exists is too obvious to require comment. The exact meaning of this correspondence leaves room for difference of opinion. In the writer's analysis, it is immaterial whether the assumption is that one line is cause and the other effect or that both lines are the effect of some common cause which lies back of everything. The point to be emphasized is that the commodity price decline could not have taken place in such aggravated form had not the contraction of credit gone on in excessive form. If the credit curve is allowed to decline another 10 per cent, it is almost inevitable that the price curve will decline sharply further. On the other hand, if the decline in the credit curve can be arrested, then it is a reasonable assumption that over a period of some months the decline in the price curve can be arrested and protected from further destructive collapse.

Whether the credit curve can be prevented from further decline depends upon the attitude of two financial groups: (a) the thousands of individual banks scattered around the country; (b) Federal Reserve authorities.

The thousands of individual banks act in the matter without any collective purpose. Like any mob, they are endeavoring to pursue individual safety and self interest, but their action in the aggregate is without rational direction.

The Federal Reserve authorities represent centralized thought, but in order to make that thought effective they must apply their effort to the reserve balances of the individual banks. Inasmuch as member banks are required by law to keep reserves with the Federal institutions, their balances come under the control of the



BANK CREDIT AND COMMODITY PRICES ARE CLOSELY RELATED.

Federal Reserve. It lies within the power of the Federal Reserve to prevent a further decline in member bank reserve balances.

This power does not automatically guarantee, however, that the credit extended by the member banks to their customers will be protected from further liquidation. If the individual bankers were to continue in such a state of fear as to cause them to exercise further liquidating pressure, the downward momentum would continue. But, to the extent that fear of this kind can be alleviated by the Reconstruction Finance Corporation and by the powers granted under the Glass-Steagall bill, the way has been cleared for a reversal of banker attitude. It is not unreasonable to assume that individual bankers have reached a point where they can be persuaded to cooperate with the Federal Reserve in a policy designed to arrest contraction, not only of the reserve base, but also of the great superstructure of credit built thereon.

Consequently, there is ground for belief that a suitable open market policy on the part of the Federal Reserve can gradually take hold and become effective as a means of combating further destructive degrees of deflation.

The Elements of a Sound Financial Program

(a) Open market purchases of bonds and bills are calculated to prevent further shrinkage in reserve balances of member banks. On Feb. 24 these stood at $1,878,000,000. They had shrunk $500,000,000 from the level of the year previous, a decline of 21 per cent. If these reserve balances can be maintained for a few months in the neighborhood of $1,900,000,000, a powerful stabilizing influence will have been put to work, an influence tending to arrest destructive deflation, an influence free from the taint of inflation, an influence aiding the monetary factor in our economic life to function constructively.

(b) The time period to be allowed for in such a program is not a day or a week but six to 12 months. The notion that the power can be jammed on in such a way as to work a miraculous sudden change is not taken seriously by careful observers.

(c) An attempt to force the pace more violently by large-scale open market purchases would justify the interpretation that the financial authorities were willing to assume responsibility for a grand wave of stock market speculation. The temptation is strong in some quarters to use credit as a device for blowing up another wild speculative balloon, to look to the stock market as a ballyhoo instrument for creating a psychology of cheer and optimism, to dress up Wall Street as a means of making the public think that the market is discounting business recovery just around the corner. If this temptation is yielded to, we may have a temporary joy-ride, but we shall pay for it afterward in a worse collapse than ever. The fundamentals of sustained business recovery cannot be pumped up in any such fantastic manner. The course of solid recovery is slow and gradual, and at such a time, the less Wall Street is used as a guide to policy the better.

(d) An attempt to subordinate Federal Reserve policy to the needs of Treasury financing at cheap rates will not command the confidence of the country as soon as it is discovered. There has been agitation in the past to remove the Secretary of the Treasury from representation on the Federal Reserve Board, and such agitation may well reappear if a program of merely cheap money to facilitate selling Treasury Certificates at cheap rates is followed out. The public should have learned by this time that cheap money has no magic virtue and may become extremely dangerous. The important step is not cheap money but stable reserve balances for member banks, not low rates in the ultra-liquid markets but a maintenance of the volume of the reserve base against the storms of depression and liquidation.

In brief, then, the elements of a sound policy are open market purchases to the degree necessary to prevent further shrinkage of reserve balances of member banks, allowance of a period of several months for the task of overcoming the inertia of deflation, an avoidance of the temptation to hitch Federal Reserve policy to the Wall Street kite, and an avoidance of the temptation to make money cheap for the mere convenience of Treasury financing.

To the extent that Federal Reserve policy stays within these conservative bounds, it leaves those who are crying "inflation" without aid and comfort. It employs the force of credit on the constructive side of economic activity and lays the financial foundations of sound recovery.

British Iron and Steel Trade Expects Some Recovery Soon

New Tariffs and Reduction in Bank Rate Expected to Stimulate Business—Exchange Still Hampers Exports

LONDON, England, Feb. 29 (*By Cable*).—Metallic ores, concentrates and residues and all scrap metals and waste suitable only for the recovery of metal have been added to the British schedule of free imports.

The new tariffs and the reduction in the bank rate favor some measure of recovery in the iron and steel industry, but no immediate effect is discernible. General demands are very meager.

Domestic users of pig iron and steel are well covered for the near future, while exports are hampered by exchange difficulties.

Australia has reduced its tariffs on pig iron, semi-finished steel, bars, joists, etc., and also on scrap. India is to continue after March 31 the special duty on galvanized sheets.

Owing to the trouble at Shanghai, Continental works have been obliged to cancel orders from the Far East, and the market consequently has collapsed. Gold prices are lower. The Belgian deliberation for a renewal of the Raw Steel Cartel and the formation of sales syndicates have failed.

Welsh tin plate makers have reintroduced a plan for regulation of output and prices. The price has been fixed at 16s. per base box, f.o.b. South Wales port. The output restriction becomes effective March 7. Payments until early June will be 1s. per base box for production in excess of quota, or a premium of 1s. per box for output below the quota. Subsequent payments will be 2s. each way. The tin plate market is quiet, following substantial sales for domestic use and for export immediately prior to the increase in the price. Some mills are well sold ahead. Second hands are offering tin plate at prices below 16s.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9 0s.	
Billets, open-hearth	5 7½	to £5 12½s.
Black sheets, Japanese specifications	9 10	to 9 12 6d
Tin plate, per base box	0 16	
Steel bars, open-hearth	7 17½	to 8 7½
Beams, open-hearth	7 7½	to 7 17½
Channels, open-hearth	7 12½	to 8 2½
Angles, open-hearth	7 7½	to 7 17½
Black sheets, No. 24 gage	8 0	to 8 10
Galvanized sheets, No. 24 gage	9 10	to 10

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 7s. 6d	
Wire rods, No. 5 B.W.G.	5 5	
Black sheets, No. 31 gage, Japanese	11 5	
Steel bars, merchant	2 11	
Beams, Thomas	2 10 6	
Angles, Thomas, 4-in. and larger	2 10	
Angles, small	2 12	
Hoops and strip steel over 6-in. base	3 10	
Wire, plain, No. 8	5 7½	
Wire, barbed, 4-pt., No. 10, B.W.G.	8 15	

Ford About to Place Steel Orders as V-Eight Plans Are Approved

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DETROIT, Feb. 29.

AFTER months of waiting, the steel industry and other suppliers now seem on the verge of receiving sizable orders from the Ford Motor Co. Mr. Ford's announcement on Saturday of what he expects to spend for materials in 1932 is regarded as the forerunner of actual buying, perhaps this week. In addition to the steel which the Ford company will produce at Rouge, purchases to be made in the open market are estimated at $47,000,000. Orders for machinery, principally for the tooling up for the V-eight, will total $6,375,000. Expenditures for malleable castings are put at $5,044,000, and for gray iron castings $4,680,000. Bodies bought from outside makers will cost $140,000,000.

Mr. Ford says that he is planning on a payroll for 100,000 men in the Detroit district and hopes shortly to be turning out 5000 to 6000 cars a day. All of this is predicated on an anticipated production of 1,500,000 a year, a figure which Ford slightly exceeded in 1930. One might question whether the motoring public, with its depleted buying power, will buy that many Ford automobiles in the next year. Mr. Ford's answer is that he intends pricing his cars so low that "the purses of the masses" can reach them. Furthermore, his mood is best reflected in his own words: "We are going to do our utmost—to risk everything if necessary; to use this surplus (of the Ford Motor Co.) to see if we cannot make what the country needs most—work, jobs."

Assembly Probable This Week

It is now believed that assembly of the new cars, particularly the improved model A, will be started this week at branch assembly plants. Parts have been shipped quietly from Rouge and from factories of outside suppliers to branch plants for a number of weeks, and this flow of materials will be stepped up as rapidly as possible. An abnormally large force of tool designers still is at work at the Rouge plant on details of the V-eight, but Mr. Ford is expected to complete final approval of all parts of the eight within a few days.

Ford to spend $47,000,000 for steel this year. Machinery for tooling up V-eight cost $6,375,000.

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Assembly of new Fords to begin at branch assembly plants this week.

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March output for the industry will be boosted by Ford's return to active production. February assemblies estimated to be less than January's.

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Old Ford employees have been called back in gradual numbers to the Rouge plant, which now has a total of about 70,000 on its payroll. This will be increased as rapidly as progress on the new cars warrants taking on more men.

Advance Sales Being Made

Ford suppliers at Toledo have been given fairly heavy releases and are shipping parts to Dearborn by truck on a two-hour schedule. Local parts makers are still waiting for volume releases, having been tooled up ready to swing into production for a number of weeks. The Murray Corpn. is making few, if any, Ford frames at the moment. A large percentage of the frames already manufactured for the new cars have been turned out at the Rouge plant, where under normal conditions half of the company's requirements are filled.

Without knowing the prices of the cars or having any models to display, Ford dealers throughout the country already are building up a backlog of orders, for which they have on hand either cash down payments or old cars as trade-ins. As predicted in this column a week ago, Mr. Ford is not planning on selling his new products on more liberal credit terms than now prevail. Stories about granting the buyer 24 months in which to pay are untrue; Mr. Ford himself is authority for the statement that "the standard terms now in use are not to be changed." Detroit is looking for the new Fords to be displayed on or about March 8.

Those familiar with the Ford company's past performance do not expect the attainment of volume production until at least the latter part of March. There is a difference of opinion regarding the ability of the Ford organization to swing into operations on a large scale much faster than at the time model A succeeded model T. It will be recalled that production rose slowly at that time.

Retail Sales Still Depressed

Chevrolet's February output is estimated at 35,000 to 40,000 cars, with a slightly larger schedule planned for March. Originally counting on making 10,000 of its new series prior to April 1, Plymouth is understood to have scaled down operations pending revelation of the new Ford. It is significant that Chevrolet is now employing a larger staff of tool designers than normal for this time of the year. Detroit is wondering whether this has any connection with a program of offering something new to compete with Ford. In any event, the public is feverishly talking about what is going to happen in the low-price field and meanwhile has practically suspended buying. The promise of lower prices in the cheap transportation group naturally and inevitably has penetrated the circle of prospective cus-

tomers in the medium-price group with depressing effects on sales.

Effect on Steel Watched

The steel people are watching the discussion of lower retail automobile prices with apprehension, knowing that further effort will be made to hammer down quotations, despite declaration by steel mills of higher quotations for second quarter. Perhaps the recent refusal of one steel mill to book 1000 tons of sheets from a large motor car company at concessions from the current level is an indication that the steel industry at last is realizing that the more tonnage it obtains at less-than-cost figures, the more money it stands to lose. Encouragement is given steel makers by the action of the Studebaker Corpn. in raising prices on its Studebaker line. The announcement declared that when the new models were first put on the market in December, prices were based on raw materials, including steel, purchased at a loss to suppliers. Now these raw materials are advancing and it has become necessary for Studebaker to readjust its retail prices upward.

Automobile Output in January Declined

WASHINGTON, March 1.—Output of motor vehicles in the United States decreased to 119,344 units in January from 121,541 in December. Passenger car production, however, rose to 98,706 from 96,753, while the truck output dropped to 20,541 from 23,644. The taxicab production was only 97.

Canadian production in January increased to 3731 from 2432 and comprised 3112 passenger cars and 619 trucks.

Conference to Consider Scrap Reclassification

The Department of Commerce will hold a conference in Washington next week to consider a revision in scrap iron and steel classifications. This conference will be held in conjunction with the annual meeting of the Institute of Scrap Iron and Steel, which convenes at the Mayflower Hotel, on March 8, for a three-day session. The revision conference will take place on Wednesday, March 9, 10.30 a.m.

Organizations which have been invited to be represented are the National Association of Purchasing Agents, Institute of Scrap Iron and Steel, American Railway Association, American Iron and Steel Institute and the Steel Founders' Society of America. Individual companies which are large consumers of scrap have also been invited to attend.

Alexander Galt of the United States Bureau of Standards will preside.

Post Office Department Buys 2000 Ford Chassis

WASHINGTON, March 1.—The Post Office Department last Wednesday awarded a contract to the Ford Motor Co. for 2000 truck chassis, for which 500 bodies will be built by the Mifflinburg Body Co., Mifflinburg, Pa., and 1500 bodies will be built by the General Motors Truck Co., Detroit.

Foundry Convention in Detroit, May 3-5

The board of directors of the American Foundrymen's Association announces that the next annual convention of the association will be held at the Hotel Statler, Detroit, May 3, 4 and 5. This announcement supersedes previous announcement that the convention and exposition would be held in Philadelphia, May 2 to 6.

The convention at Detroit will be similar in character to the annual technical and business meeting held at the Edgewater Beach Hotel, Chicago, in 1927, and will be the second time since 1905 that an annual meeting has been held without commercial exhibits.

New Stainless Steel Has 1 Per Cent. Copper

A NEW stainless steel alloy containing about 1 per cent copper, which is claimed to possess various advantages over straight chromium and the 18 and 8 chrome-nickel corrosion-resistant alloys in that it is easier to work and does not require high-temperature heat treatment for annealing, has been developed by the Ludlum Steel Co., Watervliet, N. Y., and is being placed on the market by the Associated Alloy Steel Co., Inc., Cleveland, and the steel manufacturers allied with the latter company. This steel is designated as a super-alloy and has been named Nevastain RA.

The new steel has a 0.10 per cent maximum carbon content or about the same amount as the straight chrome type. Its silicon content is about 1 per cent or higher than in the corrosion-resistant chrome-nickel alloys.

The new steel, it is claimed, is easier to work hot than the chrome and chrome-nickel alloys and in cold working it will not work harden to the same extent as other stainless alloys. A decided advantage, it is pointed out, is that only a normal heat treatment at a temperature of 1500 deg. F. is required between drawing operations to restore ductility instead of a much higher temperature as required of other grades of corrosion-resistant steels. It is a free-machining steel and is claimed to machine almost as easily as the high-sulphur types of corrosion-resistant steels. It can be sheared, punched, perforated, sawed or drilled by ordinary methods. In drawing it is stated that a maximum reduction of about 30 per cent may be made. In other words, a 10-in. diameter blank may be drawn in one operation into a 7-in. diameter cup. It may be welded by either the acetylene torch or electric arc, flash or spot-welded without a tendency to grain growth, it is asserted. It may be spun, although not so easily as copper.

In appearance the steel has a blue rather than a yellow tinge and it closely resembles chromium plate. It is said to polish readily to a high permanent luster.

This steel is now being produced in the form of bars, tubes, wire, billets and hot and cold-rolled strip, and it will be offered shortly in sheet form. The analysis of the steel is:

	Per Cent
Carbon, maximum	0.10
Manganese, about	0.40
Chromium, about	16.0
Silicon, about	1.0
Copper, about	1.0
Phosphorus and sulphur, maximum	0.030

The average tensile properties of the steel are:

BAR STOCK

	Hot-rolled	Annealed at 1500 Deg. F.
Ultimate strength (lb. per sq. in)	100,000-130,000	75,000-90,000
Yield point (lb. per sq. in.)	50,000-70,000	40,000-50,000
Elongation, per cent in 2 in.	17-25	30-40
Reduction of area, per cent	45-65	60-75
Brinell hardness	220-260	150-170
Rockwell B scale	90-103	80-90

FLAT STOCK
(0.040-0.042 In. Thick)

	Hot Rolled, Annealed and Pickled	Cold Rolled, Annealed and Pickled Longitudinal
Ultimate strength (lb. per sq. in.)	77,000-80,000	70,000-75,000
Yield point (0.020 in. by dividers)	57,000-64,000	50,000-54,000
Elongation, per cent in 2 in.	24-26	26-30
Brinell hardness	.....	.....
Rockwell B scale	79-83	81-83

Austin Co. Establishes New Welding Division

A welding division has been established by the Austin Co., Cleveland. It began operations Feb. 15, under the direction of J. E. Ferguson. Located at East 222nd Street and Nickel Plate Railroad, this "weldery" is equipped to produce a wide variety of welded steel products, including machine frames, bases and other parts, construction equipment, booms, presses, lathes, special machinery, jigs and fixtures, and benches, racks, crates and other factory furniture. Testing and other laboratories at the company's Bliss mill will be available for use in developing new welded steel designs. At the Bliss mill, where structural steel is both riveted and welded, more than 3000 tons of steel was welded in 1931.

General Electric Workers Pay Less to Unemployed

Employees of the General Electric Co., who since Nov. 1, 1931, have been contributing 2 per cent of their average full-time earnings toward the relief of part-time workers and the unemployed within the company, will have but 1 per cent deducted from their pay, starting March 1, according to announcement by President Gerard Swope.

During this four-months period, employees have contributed approximately $480,000, which has been matched dollar for dollar by the General Electric Co., making a total of $960,000. During the same four months, approximately $593,000 has been paid out to employees of the various apparatus works, leaving a balance in the fund on Feb. 29 of $367,000.

"While the estimates of the monthly amounts to be paid out for March and April, the last two months under the six-months' plan adopted last fall to assist employees during the winter months, are greater than for the preceding four months, the indications are that, with the surplus on hand, contributions of 1 per cent during these two months will be sufficient to meet the employment guarantee," Mr. Swope explained.

The $960,000 contributed to this fund does not include approximately $1,000,000 collected and distributed among employees during the 10 months preceding Nov. 1 1931, under the Swope unemployment insurance plan adopted Dec. 1, 1930. One-half of this million dollars was contributed by employees and the other half by the company.

Harnischfeger Corpn. to Build Hansen Arc Welder

Manufacturing rights for the Hansen arc welder, built and marketed by the Northwestern Mfg. Co., have been acquired by the Harnischfeger Corpn., Milwaukee. The equipment, features of which include single current control, self exciter and internal stabilizer, will be made in the same range of sizes as heretofore. Klaus L. Hansen, inventor of this arc welder, has joined the Harnischfeger staff.

The Harnischfeger Corpn., which for about 45 years has manufactured electric hoists and overhead cranes and the major electric equipment used therein, entered the welding field with the introduction of a line of welding fixtures known as position finders. These fixtures, developed originally for use in the company's own plants in the welding of steel parts for cranes and crawler type excavators, are designed for handling and holding heavy parts at angles that facilitate making proper 45-deg. welds. Two models are marketed: one is manually operated and is designed for narrow parts up to 16 ft. in length on which welding is to be done on all sides. Rotation of the part to be welded through 360 deg. is possible. The other model is of table type and is electrically operated, the piece being clamped to the table and the bed of the table then tilted by power to the required angle. Two sizes of the table model are built, for pieces weighing up to 4000 lb. and 8000 lb. respectively. Advantages claimed for these position finders include rapid positioning of the heavy pieces for welding at the correct angle and savings in handling time and in welding metal, with consequent lowering of cost in the welding shop.

Bar Iron Wage Unchanged

The wage rate on bar iron will remain unchanged for March and April as based on a 1.65c. card, according to an agreement reached between the Western Bar Iron Association and the Amalgamated Association of Iron Steel and Tin Workers. The rate is based on the average selling price of bars in the January-February period.

Steel for Concrete Roads Small Item in Total Cost

WASHINGTON, March 1.—Steel represents but 2.7 per cent of the cost of concrete pavement construction. The steel cost per square yard is 0.05c. These figures are disclosed in a study just completed by the Bureau of Public Roads, Department of Agriculture. The study was made to determine the extent to which expenditures for highway provide employment and has been published under the title "Where the Highway Dollar Goes."

Steel Founders Believe Outlook Is Better

The Steel Founders' Society of America, Inc., Graybar Building, New York, reports that sentiment among its members regarding the outlook for better business is somewhat brighter than it was a month ago, but actual results in business improvement have been negligible. In fact, most of the members reported a decline in bookings in January as compared with December.

National Lock Washer Co., Newark, N. J., is producing retaining rings, or "artificial shoulders," in standard stock sizes for shafts from 3/16-in. to 1½-in. in diameter. Each shaft size carries three sections—light, medium and heavy—both square and round shapes, open and closed types.

Market Research Book for 1932

Greater practice application of established research results to individual needs is evidenced in the new classified description of research results, "Market Research Sources," made public by the Marketing Service Division, Department of Commerce.

This 1932 edition is the fifth yearly compilation of research activities completed, current and contemplated in the marketing field, and covers the year 1931.

In announcing availability of the publication, the department stated "the paramount necessity of market research in forestalling or minimizing business wastes has commanded ever-increasing attention during the past decade. To a greater extent than ever the battle of survival is being fought out on a basis of competitive efficiency in distribution. Sales and advertising campaigns hitting blindly and extravagantly at supposed markets are no longer supportable by American industry. The tendency is to precede such efforts by a careful collection and analysis of facts which will portray the true nature and extent of customer potentials before launching such campaigns."

As the usability of such a source book decreases as its bulk increases, all research material published prior to 1925 has been eliminated from this issue, and, to assist in classifying its purpose, the title of the book has been changed with this edition from "Market Research Agencies" to "Market Research Sources." In past issues it was found impracticable to classify all of the subjects included, so a detailed index or finding guide has been included in the edition which will be of assistance in locating all available references quickly.

The publication contains a record of market research investigations including problems relating to the transfer and sale of goods and services between producer and consumer, relattionship and adjustments between production and consumption, preparation of commodities for sale and their physical distribution, wholesale and retail merchandising, the various financial problems concerned in distribution and, with this issue, the development of statistical data of value in carrying forward business research.

Among the principal agencies listed are Government bodies, trade associations, universities, chambers of commerce, newspapers, magazines, advertising agencies, publishers of books and trade directories, research foundations and individual businesses.

Copies of "Market Research Sources" may be purchased for 30c. a copy from the Superintendent of Documents, Government Printing Office, Washington, or any of the district offices.

OBITUARY

JOHN T. HARRINGTON, formerly president of the Trumbull Steel Co., died on Feb. 28 in Sydney, Australia, while on a world tour. He had been identified for many years with the iron and steel industry of the Mahoning Valley in an advisory capacity. He was born at Rock Creek, Ashtabula County, Ohio, and studied at Oberlin College and the University of Michigan. After practicing law a few years at Jefferson, Ohio, he went to Pittsburgh in 1900 to enter the steel business. At the reorganization of the Trumbull company in 1925, Mr. Harrington was elected president.

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A. L. SCHULTZ, president, A. L. Schultz & Sons, Chicago, engineers, founders and machinists, died Feb. 13. Born Sept. 27, 1862, at Neustadt, Germany, he was brought to Chicago by his parents in his infancy. He served his apprenticeship as a machinist with the American Steam Engine Co. He successively worked for Fraser Chalmers Co., E. H. Wachs Co., B. D. Eisendrath Tanning Co., and Davison Brothers Marble Co. With an old shopmate, he formed the Lemley & Schultz Co., which existed until 1908, when the business was continued as A. L. Schultz & Sons. At the time of his death he was also president of the South Elgin Sand & Gravel Co.

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BURROWS SLOAN, chairman of the board of the General Refractories Co., Philadelphia, died suddenly at his home in that city on Feb. 28, aged 54 years. After his graduation from Princeton University in 1899, he became identified with the Reading Iron Co. He left that position to become associated with the Harbison-Walker Refractories Co., Pittsburgh, and was made Eastern representative of that company a few years later. In 1911, with former Governor Sproul, Mr. Sloan organized the General Refractories Co. and became president in 1925. He was named chairman of the board last year.

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CHARLES PINCKNEY WHEELER, formerly president of Pickands, Brown & Co. and a partner in Pickands, Mather & Co., which has superseded the first named company, died Feb. 27 of a heart attack at his winter home at Pasadena, Cal. He was 75 years old and had been identified with the iron industry in Chicago for more than 50 years. Born at Mount Carroll, Ill., Mr. Wheeler attended Northwestern University, where he was awarded his A.B. degree in 1879. After spending a year at Columbia University Law School, Mr. Wheeler entered the pig iron, coke and iron ore business and became a partner in Pickands, Brown & Co. in 1888. Mr. Wheeler was a trustee of Northwestern University from 1900 to 1922. One of his sons, Seymour, is at present a partner in Pickands, Mather & Co.

J. T. HARRINGTON

A. L. SCHULTZ

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JOHN PUGH, JR., for many years associated with J. I. Case Co., Racine, Wis., as chief engineer and general superintendent of the tractor department, died Feb. 22, aged 51 years. He had retired three years ago because of ill health. Mr. Pugh was born in Racine and was graduated in 1903 from the University of Wisconsin with the degree of bachelor of science in electrical engineering. Later he earned his master's degree in mechanical engineering and joined the Case company, where he developed large steam traction engines and gasoline and oil tractors.

JOHN GOODRICH OSBORNE, vice-president, Lakeside Malleable Castings Co., Racine, Wis., died Feb. 24 at his home in Milwaukee from pneumonia. He was born in Milwaukee in 1879, the son of William H. Osborne, who in 1876 founded the Wisconsin Malleable Iron Co. in Milwaukee and later the Lakeside foundry in Racine.

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A. T. COOPER, assistant manager of sales in the tubular goods department of the Columbia Steel Co., San Francisco, died suddenly on Jan. 28 at his home from a heart attack. Mr. Cooper had been for 27 years in the employ of the United States Steel Corpn., for seven years with the National Tube Co. at Pittsburgh and for the past 20 years in the Pacific Coast general offices. He was 56 years old.

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JOHN WALTON ENSIGN, district manager in charge of the Huntington, W. Va., plant of American Car & Foundry Co., died at his home at that city on Feb. 18 after a brief illness. He was 61 years old. His father, Major Ely Ensign, was managing executive of the Ensign Mfg. Co., one of the companies constituting the nucleus from which the American Car & Foundry Co. was formed in 1899. After the consolidation, Major Ensign became district manager at Huntington and was succeeded by his son, John Walton Ensign, upon his death.

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HERMAN L. WINTERER, president of the Box Crane & Hoist Corpn., and head of the H. L. Winterer Machinery Co., both of Philadelphia, died of a heart attack at his home in that city on Feb. 27, aged 61 years. He had been in the machinery business for nearly 40 years.

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BENJAMIN B. GREER, until last September president of the New York Air Brake Co., died suddenly at his home near New Canaan, Conn., Feb. 28. After his graduation from Dartmouth College in 1901, he entered railroad service and held various executive positions in that field until 1925, when he was made president of the New York Air Brake Co. Mr. Greer was 55 years old.

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FREDERICK L. HUTCHINSON, since 1912 secretary of the American Institute of Electrical Engineers, died after a brief illness at East Orange, N. J., Feb. 26. He was born in Elizabeth, N. J., April 2, 1866, and was graduated from Cornell University in 1893 as an electrical engineer. His early connections were with the Westinghouse Electric & Mfg. Co., the C. W. Hunt Co. and the National Electric Co.

... PERSONALS ...

J. L. HENCH, vice-president of the Mid-West Forging Co., Chicago, with works at Chicago Heights, Ill., has been elected vice-president and director of the Achuff Railway Supply Co., St. Louis, distributer of Mid-West Forging Co. products.

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E. A. STILLMAN, president, Watson-Stillman Co., Roselle, N. J., has returned from a business trip to England, Germany and France. While in England he obtained the American rights to the Henley straight-through lead sheathing presses, also an agreement with Davy Brothers, Sheffield, covering the manufacture of Watson-Stillman equipment in England and the manufacture in the United States of certain of Davy Brothers' hydraulic equipment. In Germany he visited and inspected several machinery building plants.

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ROBERT S. SCHMIEDER, formerly associated with Milcor Steel Co., Milwaukee, manufacturer of sheet metal building products and fireproof building materials, has joined the Super-Steel Products Co., Milwaukee, as secretary.

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BRUNO RAHN, chief engineer, Milwaukee Gas Light Co., Milwaukee, has been appointed general manager, assuming duties heretofore in charge of REZEAU B. BROWN, president. For the present Mr. Rahn will continue to act as chief engineer.

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A. G. BEAL, formerly New York and New England district sales manager for the Alan Wood Steel Co., Conshohocken, Pa., has resigned.

JOHN H. VAN DEVENTER, editor, THE IRON AGE, delivered an address entitled "What Must We Do to the Machine?" before the Hungry Club of Pittsburgh Feb. 29. An abstract of his remarks will appear in our issue of March 10.

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C. H. SMITH, president of the American Drop Forging Institute and of the Steel Improvement & Forge Co., Cleveland, will address a forging meeting of the Cleveland chapter of the American Society for Steel Treating at the Cleveland Club, March 7, on "The Future of the Drop Forging Industry." A. M. STEEVER, chief metallurgical engineer, Great Lakes Forge Co., Chicago, will deliver an address on "Forging and Forging Failures," and C. D. HARMON, National Machinery Co., Tiffin, will present a movie reel showing modern forging equipment.

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W. H. DICKSON, assistant general manager of sales of the Alan Wood Steel Co., has been transferred from the Philadelphia office to the New York office, of which he has taken temporary charge. He succeeds Arthur H. Beale. H. W. Merriman continues as sales manager of the Philadelphia office.

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J. S. ULLMANN has been appointed Washington representative, with office at 4000 Cathedral Avenue, of the DeVilbiss Co., Toledo, Ohio, maker of air compressing and spray-painting equipment. Mr. Ullman is familiar with the District of Columbia, as he served it through his previous headquarters in Baltimore.

Freight Rate Decisions

WASHINGTON, March 1.—Rates on iron and steel products from the Los Angeles, Cal., district to Arizona destinations are not unreasonable or unduly prejudicial, it was held by an Interstate Commerce Commission decision made public last Saturday. It was also held that west-bound transcontinental tariffs permitting substitution at intermediate transit points of iron and steel tonnage originating in different rate territories do not violate the interstate commerce act. Complaint against the rates and transit privilege was made by the Los Angeles Chamber of Commerce on behalf of steel fabricators and manufacturers. It was charged that the rates from Los Angeles district to Arizona points are unreasonable and unduly preferential of competitors located at transit points intermediate to Pittsburgh and Chicago.

The Interstate Commerce Commission has denied an application of Southern railroads to put into effect upon one day's notice a rate of $2.75 per net ton on cast iron pipe from the Birmingham district to Mobile, Ala., and Pensacola, Fla., for export. The present rate is $3.13. The carriers, however, have been given authority to include the rate in a supplemental tariff for consideration by the commission. It is understood the reduced rate is being sought in an effort to meet competition in foreign markets with cast iron pipe plants along the Atlantic seaboard.

The Interstate Commerce Commission has dismissed a complaint of steel fabricators charging that the failure of railroads to grant transit on steel products shipped to Decatur, Ill., and reshipped as set-up tanks resulted in unreasonable rates and undue preference of competitors. The commission had been asked to establish the same transit arrangements at Decatur as are accorded competitors at Dubuque, Iowa, Kansas City, Minneapolis and St. Paul. The points of origin include Granite City, East St. Louis and Chicago, St. Louis, Pittsburgh and Coatesville, Pa., Claymont, Del., Cleveland, Youngstown and Wheeling, W. Va.

Scrap Dealers Elect Chapter Officers

New officers have been elected by four Midwestern chapters of the Institute of Scrap Iron and Steel. William J. Ross, Hyman-Michaels Co., Chicago, becomes president of the Chicago chapter; Lee J. Workum, L. J. Workum Co., Portsmouth, Ohio, is president of the Cincinnati chapter; Darwin S. Luntz, Luntz Iron & Steel Co., Canton, Ohio, is president of the Cleveland-Detroit chapter, and B. P. Williams, Hickman, Williams & Co., St. Louis, is president of the St. Louis chapter.

The following chairmen of the executive committees of the chapters were elected: Ben Kaplan, of M. S. Kaplan Co., Chicago, Chicago chapter; Samuel G. Cornsweet, Cornsweet Iron Co., Cleveland, Cleveland-Detroit chapter; J. R. Forcheimer, St. Louis, St. Louis chapter.

Kling Brothers Purchase Line from Ryerson

Kling Brothers Engineering Works, Chicago, has purchased from Joseph T. Ryerson & Son, Inc., the complete line of Ryerson's high-speed friction saws and accessory equipment. This purchase includes good will and complete manufacturing and selling rights as well as drawings, patterns and stock on hand. For a number of years the Kling plant has manufactured these machines for Joseph T. Ryerson & Son.

General distribution of the friction saw line, including sales engineering, contacting of sales agents and other activities will be handled through the Bryant Machinery & Engineering Co., 400 West Madison Street, Chicago. Plans for marketing are unique in that they involve an unusual coordination of the sales, servicing and engineering forces of the factory and distributing organization.

Symbols for mechanics, structural engineering, and testing materials have been approved by the American Standards Association, 229 West Thirty-ninth Street, New York, as American Standard. The standard consists of letter symbols for 69 quantities commonly used in these fields.

• • EDITORIAL

A Moratorium on Politics

THE Federal Government, in both legislative and administrative divisions, has acted intelligently and forcefully in the effort to aid the restoration of normal business. The absence of party politics is particularly commendable when it is considered that the country is entering a Presidential campaign. Members of both leading parties in Congress have thrown aside partisanship and buckled down to the business in hand.

The cooperation which has thus far been displayed was no doubt engendered by a recognition of the seriousness of the situation and it could hardly have been better in actual time of war.

There have been signs recently that some of our political war horses have been chafing at the bit and are becoming restive in this unusual atmosphere of harmony. For the sake of business recovery we hope the moratorium on politics will be continued.

The administration and both parties in Congress have set a good example. Now it is up to finance and business to do as well.

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Finance, Ford and Faith

AT a time when the Federal Government, through the Reconstruction Finance Corporation, the Glass-Steagall Bill, its anti-hoarding campaign and the issuance of "baby bonds," is doing all in its power to dispel the fear which has swept the country, the action of one of our leading industrialists in staking his huge fortune on the launching of a new product is most heartening. We are referring, of course, to Henry Ford, whose organization is now getting into production on the improved model A and V-eight cars.

Said Mr. Ford last Saturday in Detroit, "The American people have made the Ford Motor Co. what it is today. We have nothing that the public did not give us. No surplus exists for private benefit—every surplus is provided for future use. The future is here, now, and we are going to do our utmost—to risk everything, if necessary; to use this surplus which the public, through its dealings with us, has provided, to see if we cannot make what the country needs most—work, jobs."

It is estimated that Mr. Ford shortly will have 100,000 men on his payroll at Dearborn, that his suppliers, scattered all over the United States, will employ an additional 300,000 men. Mr. Ford expects to spend this year in Michigan alone $300,000,000 for raw materials, manufactured parts and supplies, freight and shipping rates and labor. He will expend $47,000,000 for steel, $6,375,000 for additional machinery, $5,044,000 for malleable castings and $4,680,000 for gray iron castings.

Here is a practical demonstration of what can be done to counteract fear. Mr. Ford is putting his money to work, risking it because he has faith in the future of this country. And, as he keeps telling those about him, "You know—faith is catching." It is to be hoped that this faith will spread to the banker who today gets a cold chill when he is approached for a sound loan by a manufacturer; to the industry which can effect economies by modernizing equipment, and to the consumer who has money to spend, but declines to spend it even in modest amounts.

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The President's Cue to the Bankers

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There are significant points to be noted in the President's statement. They are to be seen between the lines as well as in cold type. They may be indicated without presuming too much in interpreting the message. First, notice is served upon foreign countries that withdrawal of gold reserves from the United States will not in the least affect its ability to remain firmly on the gold standard. Secondly, emphasis is placed on the obligation of the banks to do their part now that the Government has done and is doing its part.

"I trust that our banks, with the assurance and facilities now provided, will reach out and aid business and industry in such fashion as to increase employment and aid agriculture," said the President.

To which business unanimously responds: Amen!

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A machinery manufacturer reports an incident of this sort which we find is not at all uncommon. Last Wednesday he was asked to submit a proposition in connection with a project involving approximately $60,000. He was also asked whether, if he got the job, he could assure delivery within ten days.

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With competition as keen as it is today, and with so many suppliers anxious to do business at any cost in order to hold together the remains of skeleton organizations, it is not difficult for the buyer to play his various sources of supply against each other until a ridiculous price is secured.

This is not good business. It is short-sighted business, even for the man who thinks he is getting a bargain, for he is draining the lifeblood of business prosperity. And this lifeblood is common to all business, including his own.

When a concern of this sort bleeds its suppliers white, it is actually cutting its own throat at the same time. For the suppliers must in turn curtail in the matter of wages or dividends and thus reduce the purchasing power for buying the contracting company's product. The automobile maker, for example, who obtains steel or other materials at a profitless price may be getting a temporary bargain at a large future cost.

One prominent automobile concern had a rule which it enforced in days gone by and which possibly, in its case, has survived the economic storm also. It was *not* knowingly to place an order at a price on which the supplier could not make a profit. If one supplier could make a lower price than another because of operating advantages, well and good, but the unintelligent price cutter who went below his cost did not get the business if the buyer knew it.

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Individualism has done great things for us in the past. Its mistakes have been outweighed by its advantages and successes. But of late, something seems to have gone wrong with it.

The rugged individualism of the steel industry, for example, and the insistence on sticking to the principle of "get the business regardless of profit" has eaten away its earning power and dissipated its assets. The same thing has happened in many other industries.

The concern that does not work for a profit, works for nothing. And the willingness to work for nothing, in order to keep competitors from making a profit or working at all, may be an expression of individualism but it is not an example of good initiative. It looks more like business anarchy.

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February Daily Pig Iron Output Shows First Gain Since April

An Increase of About 6 Per Cent—Four More Furnaces Making Iron on March 1 Than on Feb. 1

PRODUCTION of coke pig iron in February totaled 964,280 gross tons, an average of 33,251 tons daily. The daily output gained almost 6 per cent over the corresponding January figure of 31,380 tons. The increase was the first since last April.

There were 65 furnaces in operation on March 1, against 61 on Feb. 1. They were making iron at the rate of 33,280 tons daily against 30,630 tons on Feb. 1. The number of stacks in blast at the bottom of the 1921 depression was 69 Aug. 1, but their operating rate was only 28,175 tons daily.

Seven furnaces were blown in during February and three were blown out, a net gain of four furnaces. Of the total the Steel Corporation showed the greatest gain, putting in three furnaces and taking none off. One Carrie and one Ohio furnace of the Carnegie Steel Co. and one Joliet furnace of the Illinois Steel Co. were blown in. The Bethelehem Steel Co. blew out a Cambria furnace and the Republic Iron & Steel Co. banked one in its Haselton group. The Youngstown Sheet & Tube Co. blew in a Hubbard furnace, as did the American Rolling Mill Co. at Ashland, Ky. The Shenango Furnace Co. and the Woodward Iron Co. put on one furnace each. The furnace of the Jackson Iron & Steel Co. was blown out.

Daily Average Production of Coke Pig Iron

Gross Tons

	1930	1931	1932
January	91,209	55,299	31,380
February	101,390	60,950	33,251
March	104,715	65,556	.....
April	106,062	67,317	.....
May	104,283	64,325	.....
June	97,804	54,621	.....
½ year	100,891	61,356	.....
July	85,146	47,201	.....
August	81,417	41,308	.....
September	75,890	38,964	.....
October	69,831	37,848	.....
November	62,237	36,782	.....
December	53,732	31,625	.....
Year	86,025	50,069	.....

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Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) February (29 Days)	Production (Gross Tons) January (31 Days)	March 1 Number in Blast	March 1 Operating Rate, Tons a Day	February 1 Number in Blast	February 1 Operating Rate, Tons a Day
Buffalo	77,855	74,764	5	2,680	5	2,410
Other New York and Mass.	6,500	4,233	1	225	1	200
New Jersey	....	....	0	....	0	....
Pennsylvania:						
Lehigh Valley*	28,465	31,211	3	980	3	1,010
Schuylkill Valley	....	....	0	....	0	....
Susquehanna and Lebanon Valleys	13,966	15,380	1	480	1	495
Ferromanganese	....	....	0	....	0	....
Pittsburgh District	158,979	168,441	10	5,600	9	5,175
Ferro. and Spiegel.	4,010	4,478	1	140	1	145
Shenango Valley	7,963	....	1	500	0	....
Western Pennsylvania	27,917	18,122	1	565	1	585
Ferro. and Spiegel.	....	6,772	0	....	1	220
Maryland	38,936	43,366	2	1,340	2	1,400
Wheeling District	75,240	79,865	4	2,600	4	2,650
Ohio:						
Mahoning Valley	89,686	87,122	6	2,700	5	2,285
Central and Northern	75,849	71,484	5	2,615	5	2,305
Southern	12,866	14,533	1	340	2	470
Illinois and Indiana	202,139	220,556	12	7,300	11	6,865
Mich., Wis. and Minn.	22,082	22,906	2	760	2	740
Colo., Mo. and Utah	22,783	19,570	2	785	2	775
Virginia	....	....	0	....	0	....
Kentucky	8,162	....	1	435	0	....
Alabama	90,882	89,981	7	3,235	6	2,900
Ferromanganese	....	....	0	....	0	....
Tennessee	....	....	0	....	0	....
Total	964,280	972,784	65	33,280	61	30,630

*Includes spiegeleisen.

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Merchant Iron Made, Daily Rate

1931	*Tons*	1931	*Tons*
Jan.	9,416	Sept.	8,985
Feb.	11,332	Oct.	7,051
March	11,481	Nov.	5,758
April	13,439	Dec.	6,778
May	13,212		
June	11,209	1932	
July	12,012	Jan.	6,256
Aug.	9,569	Feb.	7,251

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Production of Coke Pig Iron and of Ferromanganese

Gross Tons

	Pig Iron* 1931	Pig Iron* 1932	Ferromanganese† 1931	Ferromanganese† 1932
January	1,714,266	972,784	14,251	11,250
February	1,706,621	964,280	19,480	4,010
March	2,032,248	.....	27,899	.....
April	2,019,529	.....	25,456	.....
May	1,994,082	.....	23,959	.....
June	1,638,627	.....	11,243	.....
½ year	11,105,373	.....	122,288	.....
July	1,463,220	.....	17,776	.....
August	1,280,526	.....	12,482	.....
September	1,168,915	.....	14,393	.....
October	1,173,283	.....	14,739	.....
November	1,103,472	.....	14,705	.....
December	980,376	.....	15,732	.....
Year	18,275,165	.....	212,115	.....

*These totals do not include charcoal pig iron. The 1930 production of this iron was 96,580 gross tons.
†Included in pig iron figures.

California Steel Co. Has Not Been Sold

The McClintic-Marshall Corpn. states that the report published last week that it had purchased the California Steel Co. is incorrect. The error occurred through the fact that Charles E. Spencer, for many years proprietor and manager of the California Steel Co., has joined the McClintic-Marshall organization.

A. O. Smith Corpn. Awarded 85 Tanks

A. O. Smith Corpn., Milwaukee, has been awarded the contract for 85 helium storage tanks for the Sunnyvale Naval Air Station at Mountain View, Cal.

Shipments of enameled sheet metal ware in December, 1931, totaled 233,267 doz., against 197,080 doz. in November, according to reports received by the Bureau of the Census from 15 manufacturers.

Pig Iron Production Gains 6 Per Cent; First Increase Since Last April

Steel Ingot Output, Still at 26 Per Cent, Will Be Stimulated by Ford Releases, Momentarily Expected—Railroad Buying Broadens

PIG iron production in February gained almost 6 per cent over that of January, figured on the daily rate, the first increase since April, 1931. Last month's daily output was 33,251 gross tons, against 31,380 in January. The total for the month, which had two less working days than January, was 964,280 tons, compared with 972,784 tons. In February, 1931, the total was 1,706,621 tons, or an average of 60,950 tons a day.

There was a net gain of four blast furnaces during the month, seven having gone in while three were blown out. On March 1, 65 furnaces were active against 61 on Feb. 1.

Steel ingot production probably made a smaller gain in February than pig iron. And the rate of ingot output failed to gain this week, operations being estimated at 26 per cent, the same as for last week. The Ford business, when released, will bring an almost instantaneous stepping up of steel-making schedules.

PROSPECTS of heavy steel releases from the Ford Motor Co. have improved sentiment in the steel industry. Although no sizable orders have yet come from Ford, a few producers of sheets have been informed of the tonnage that they will receive and are awaiting the word to begin rolling. It is improbable that the Rouge plant of the Ford company will attain volume production before April in view of the preliminary work yet to be done on the eight-cylinder car, for which the public demand is expected to be larger than for the four-cylinder model. In fact, three-fourths of the 100,000 cars that Ford dealers are reported to have sold are the eight-cylinder model, which will not be ready for distribution for a month or more.

The Ford showing of new models is expected to stimulate activity among other makers of cars in the low-price group whose steel releases have lately been curtailed. The Chevrolet program for March is smaller than that of February, reflecting small retail sales pending the appearance of the new Ford cars. Schedules at Chrysler plants are being well maintained.

RAILROAD activity in the steel market continues to show a gradual awakening. The New York Central is expected to inquire this week for 50,000 tons of rails. The Southern Pacific has allocated 13,800 tons to the Colorado mill and 11,200 tons to the Alabama mill. Other roads may place their long-delayed tonnages within the next few weeks. In addition, miscellaneous orders for repair material are coming more frequently from the carriers. The 1932 bridge program of the Union Pacific System calls for 5000 tons of structural shapes.

Building construction, though still much below seasonal expectations, has shown an encouraging spurt. Structural steel awards, at 19,200 tons, are the largest for any week this year, while new projects call for 26,200 tons, also higher than any recent figure. About half of the fresh tonnage is for post office buildings.

Most of the pipe line inquiries that have recently been quoted on are still delayed by financing difficulties, but it appears that an extension of the Continental Construction Corpn.'s gas line from Chicago to Milwaukee may soon be awarded. An export inquiry for about 250,000 tons of 12¾-in. pipe for an oil line from the Irak petroleum fields to the Mediterranean, in which American and European oil companies are interested, has been revived. A part of the tonnage probably will come to American mills.

EFFORTS toward price stabilization of steel products are receiving little impetus owing to the absence of sufficient new business to test quotations. However, steel companies are firmly quoting the new prices on bars, plates, shapes, sheets, strip and bolts and nuts. Chicago district producers have followed the Pittsburgh mills in raising prices of bars, plates and shapes $2 a ton. The advances will not take effect on much business until the second quarter because of contract coverage running through March.

An interesting feature of the new prices announced by sheet makers is the establishing of extras for less-than-carload lots. For less than 50 bundles (about 150 lb. each) an extra of 35c. per 100 lb. will be applied and for more than 50 bundles, but less than a carload, the extra is to be 25c. per 100 lb. The significance of this move is that steel companies have long contended that they should be compensated for the additional expense incurred in rolling small orders, and, moreover, they have insisted, without much effect, that the small buyer is not entitled to the minimum market price. Similar quantity extras recently established on wire products have been put into effect quite successfully.

In view of the fact that higher prices on some products have not yet been fully established. THE IRON AGE has not changed the published quotations entering into its finished steel composite price, which remains at 2.037c. a lb. Pig iron and steel scrap are also unchanged.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, one Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Mar. 1, 1932	Feb. 23, 1932	Feb. 2, 1932	Mar. 3, 1931
No. 2 fdy., Philadelphia	$15.64	$15.64	$15.64	$17.76
No. 2, Valley furnace	15.00	15.00	15.50	16.50
No. 2 Southern, Cin'ti	13.82	13.82	13.82	14.19
No. 2, Birmingham	11.00	11.00	11.00	13.00
No. 2 foundry, Chicago*	16.50	16.50	16.50	17.50
Basic, del'd eastern Pa.	*16.00*	16.25	16.25	17.25
Basic, Valley furnace	14.50	14.50	15.00	16.50
Valley Bessemer, del'd P'gh.	17.39	17.39	17.89	18.76
Malleable, Chicago*	16.50	16.50	16.50	17.50
Malleable, Valley	15.50	15.50	16.00	17.00
L. S. charcoal, Chicago	23.17	23.17	23.17	27.04
Ferromanganese, seab'd carlots	†75.00	†75.00	†75.00	80.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

Rails, Billets, etc.,

Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	30.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	30.00
Slabs, Pittsburgh	27.00	27.00	27.00	30.00
Forging billets, Pittsburgh	33.00	33.00	34.00	36.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.50	1.50	1.50	1.60

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.50	1.50	1.50	1.65
Bars, Chicago	1.60	1.60	1.70	1.70
Bars, Cleveland	**1.65**	1.55	1.55	1.70
Bars, New York	1.85	1.85	1.85	1.98
Tank plates, Pittsburgh	1.50	1.50	1.50	1.65
Tank plates, Chicago	1.60	1.60	1.70	1.70
Tank plates, New York	1.798	1.798	1.798	1.93
Structural shapes, Pittsburgh	1.50	1.50	1.50	1.65
Structural shapes, Chicago	1.60	1.60	1.70	1.70
Structural shapes, New York	1.76775	1.76775	1.76775	1.90½
Cold-finished bars, Pittsburgh	2.00	2.00	2.00	2.10
Hot-rolled strips, Pittsburgh	1.40	1.40	1.40	1.55
Cold-rolled strips, Pittsburgh	1.90	1.90	1.90	2.25

Finished Steel

Per Lb. to Large Buyers:	Mar. 1, 1932 Cents	Feb. 23, 1932 Cents	Feb. 2, 1932 Cents	Mar. 3, 1931 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.15	2.15	2.15	2.35
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.30	2.30	2.30	2.45
Sheets, galv., No. 24, P'gh	2.75	2.75	2.75	2.90
Sheets, galv., No. 24, Chicago dist. mill	2.85	2.85	2.90	3.00
Hot-rolled sheets, No. 10, P'gh	1.60	1.60	1.60	...
Hot-rolled sheets No. 10, Chicago dist. mill	1.70	1.70	1.70	...
Wire nails, Pittsburgh	1.95	1.95	1.95	1.90
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., P'gh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	2.60
Tin plate, 100 lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	$10.25	$10.25	$10.25	$13.00
Heavy melting steel, Phila	7.37½	7.37½	7.50	10.50
Heavy melting steel, Ch'go	7.12½	7.12½	7.25	10.00
Carwheels, Chicago	*7.25*	7.50	7.50	10.50
Carwheels, Philadelphia	10.50	10.50	10.50	13.50
No. 1 cast, Pittsburgh	9.75	9.75	10.00	12.50
No. 1 cast, Philadelphia	10.00	10.00	10.00	11.50
No. 1 cast, Ch'go (net ton)	7.50	7.50	7.50	9.50
No. 1 RR. wrot., Phila	8.50	8.50	8.50	12.00
No. 1 RR. wrot., Ch'go (net)	6.50	6.50	6.50	8.00

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	$2.25	$2.25	$2.25	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*6.12½*	6.50	6.87½	10.62½
Electrolytic copper, refinery	*5.50*	6.00	6.50	10.25
Tin (Straits), New York	*21.90*	22.25	22.25	26.75
Zinc, East St. Louis	*2.75*	2.82½	2.85	4.05
Zinc, New York	*3.12*	3.19½	3.22	4.40
Lead, St. Louis	*3.05*	3.55	3.55	4.35
Lead, New York	*3.30*	3.75	3.75	4.60
Antimony (Asiatic), N. Y.	*6.37½*	6.75	7.25	7.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
March 1, 1932	2.037c. a Lb.	$14.48 a Gross Ton	$8.23 a Gross Ton
One week ago	2.037c.	14.48	8.23
One month ago	2.037c.	14.65	8.33
One year ago	**2.142c.**	15.71	11.17
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1931	2.142c., Jan. 13	2.052c., Dec. 29	$15.90, Jan. 6	$14.79, Dec. 15	$11.33, Jan. 6	$8.50, Dec. 29
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08. May 5

Pittsburgh Mills Await Ford Business; Operations Are Slightly Better

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PITTSBURGH, March 1.—Announcement of impending steel purchases by the Ford Motor Co. has again boosted sentiment in this district, although the better feeling is hardly justified by current releases. Incoming tonnage last week showed no improvement over that of the previous comparable period, and the volume of specifications coming in this week reflects no gain. In fact, some companies continue to report a decrease in orders. This is particularly true among manufacturers of sheets and strip steel, who are not yet getting releases from the Ford Motor Co., and whose tonnage from other automobile manufacturers has recently been falling off.

Steel producers in this district have been led to believe that Ford purchases may be delayed for 10 days or two weeks and that specifications against such orders will not be forthcoming before March 15. A few, however, are confident that the Ford business will begin to come out this week.

Steel demands from other sources show no material change, although purchases by the railroads are growing in a very limited way. One road in the district is inquiring for 150 freight cars, and it is believed that the New York Central will make inquiry this week for rails. A little business in accessories is before the trade.

Building projects are still few and small, but a little private work is coming out, which, added to Government inquiry, has given the market a better prospect. There is also the likelihood of the placing of some line pipe business this month.

Steel ingot production in the Pittsburgh district has risen moderately, and now stands at 25 per cent of capacity. One of the larger interests is running at an even better rate, and nearly all of the smaller independents are using a quarter of their actual capacity. Production has also risen slightly in the Valleys, largely because of a step-up in output by the leading interest. Operations in that district now average about 28 per cent. No change is reported from the Wheeling district. Finishing mill schedules are still widely divergent and fluctuate from week to week, particularly in the case of flat-rolled products.

Bolts have been added to the growing list of finished steel products on which efforts are being made to stabilize prices. The discount is now 75 per cent off list, an advance over previous quotations of 73, 10 and 10 per cent, and some orders have been booked at the new levels. Advanced prices on sheets and strip are yet to be tested by tonnage buying, although long ternes are now definitely higher.

Steel trade sentiment improved by prospect of heavy releases by Ford Motor Co.

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Steel demands from other sources show no material change.

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Ingot output in Pittsburgh and in the Valley shows moderate increase.

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Price stabilization movement continues, but without much test in new business.

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Makers of heavy hot-rolled products are now generally quoting 1.60c., Pittsburgh, on second quarter business. This advance is not likely to affect cold-finished steel bars, which may remain at 2c., Pittsburgh, on second quarter contracting.

Pig Iron

The market remains quiet, with business made up principally of carload lots. On such tonnages the full market quotations are usually obtained. No new inquiry has appeared. A blast furnace at Johnstown has gone out of production, leaving only one active stack out of a possible nine.

Semi-Finished Steel

Efforts at price stabilization are receiving little impetus because of the absence of new business to test quotations. However, sellers regard the market on billets, slabs and sheet bars as $27, Pittsburgh, with Valley mills quoting the same level. Forging billets are unchanged, and purchases are limited. Makers of wire rods have expressed their willingness to take second quarter business at the present price of $37, Pittsburgh, but users are showing practically no interest in their forward needs.

Rails and Track Supplies

The Nickel Plate has not yet closed against its recent inquiry for accessories to accompany the rail tonnage placed last week. It is reported that the New York Central will soon inquire for rails. Some of the other large carriers are expected to inquire during the month. Rail mills already have some tonnage scheduled for late March and April rolling, but far from enough to insure a steady operating rate during that time.

Bolts, Nuts and Rivets

Makers of bolts have advanced prices by announcing a flat discount of 75 per cent off list, instead of the 73 and two 10's which have prevailed recently. The lower discount applies to current tonnage as well as second quarter bookings, and a little business has been booked at the higher level. Large rivets are unchanged at $2.25 a 100 lb., Pittsburgh, while small rivets continue at 70, 10 and 5 per cent off list.

Bars, Plates and Shapes

Inquiry for structural steel and reinforcing bars is beginning to show improvement, but bookings are still rather light. However, business before the trade at present on which bids will be taken during the month indicates a considerable gain in awards of the next few weeks. Post office and other Government projects predominate, but improvement is also noted in private enterprises. Low prices in competitive bidding are an unfavorable factor, with quotations on material fabricated and erected particularly discouraging. Mills are making an effort to maintain the present 1.50c., Pittsburgh, price, although shading occurs on large tonnages. For second quarter 1.60c. is being quoted, but has not been tested. During the next week a price policy on reinforcing bars will probably be announced. Demand for plates is still quiet, although the Wheeling & Lake Erie is inquiring for freight cars and some Government river craft inquiry is appearing. Fabricated tanks are particularly dull. Buying of bars by the automobile industry has failed to show any gain.

Cold Finished Steel Bars

February business failed to equal the low January levels, but inquiry for March buying is somewhat heavier.

While mills have not opened their books for second quarter, no advance from the present quotation of 2c. is contemplated.

Tubular Goods

The pipe business is still very dull, and operations are dependent upon the accumulation of orders over a period of a week or more. This makes the aggregate rate of production for the industry difficult to gage, and estimates are generally very low. Line pipe tonnage is still lacking and projects before the trade are slow to materialize. The inquiry issued several weeks ago by Brokaw, Dixon, Garner & McKee, Inc., New York, for 200 miles of 20-in. pipe has not yet passed the tentative stage. The Continental Construction Corpn's. inquiry for a line into Milwaukee is possibly the most likely to be acted upon in the near future. Mention of a reduction in prices of copper-bearing steel pipe made last week was in error, the decline having applied only to Toncan iron pipe, which is made by only one company, and sells on a competitive basis with wrought iron pipe.

Wire Products

Business shows a little improvement, and the merchant trade is beginning to show more interest in its future requirements. Second quarter prices on wire and nails will be unchanged at 2.20c., Pittsburgh, for manufacturers' wire, and $1.95 a keg for nails.

Sheets

Releases were light again last week, but showed no further gain over the previous comparable period. Lack of tonnage from the automobile industry has had a depressing effect upon the market, but the prospect of heavy Ford business in the next few days has improved sentiment considerably. It is also believed that the announcement of the new Ford models will stimulate competitors in the same price class who have reduced their requirements in recent weeks. No additional sheet demand from other sources is reported, although the minimum requirements of the leading manufacturing industries are being fairly well maintained. Some tonnage is coming from makers of electrical refrigerators, but this business seems to be less active than usual.

Lack of purchases during the week has prevented any test of the new prices recently announced on sheet steel products, although a few small orders have been taken at the higher quotations. Some inquiry for long ternes has appeared, and the 3c. price has been quoted in all instances.

Tin Plate

Releases by the large container manufacturers have been heavier in the last week, but tonnage shipped has come principally from makers' stocks and has not affected the rate of operations. However, surplus stocks will be reduced very quickly if the can company specifications continue, and the usual spring rise in production can be expected even though somewhat later than usual. Output continues at about 40 per cent of capacity, with the independents running at a slightly higher rate than the leading interest.

Coke and Coal

Demand shows little change, although shipments of domestic coal and coke during February showed a satisfactory gain over the preceding month. Movement of furnace coke has also been heavier, as a few stacks have gone into blast. Foundry grade continues very dull.

Strip Steel

Specifications are still light, and the prospect of the placing of Ford tonnage has given the market a much more favorable tone. Efforts at price stabilization are also receiving more impetus, and makers of cold-rolled strip have announced a minimum quotation of 2c., Pittsburgh, on new business. The market has recently ranged from 1.90c. to 2c. On hot-rolled material no deviations from the minimum prices of 1.40c. and 1.50c., Pittsburgh, are reported, and small orders are sometimes bringing $1 a ton more. As the latter constitute the bulk of current business, the price range is easily justified. Operations continue very light, with most of the smaller mills running a few turns every other week.

Old Material

Scarcely any mill buying has been reported, although one important user is expected to place tonnage before the end of the week. This expectation has given the market a somewhat brighter tone, following a period of growing weakness. A small consumer purchase of hydraulic compressed sheets at $10 has been reported. This is in line with recent quotations on this material. Little or no scrap buying by the foundries is reported, although a few of them are still taking in scrap from time to time. The Pennsylvania Railroad list, closing March 2, contains 20,900 tons, including 5300 tons of wheels and 1200 tons of heavy melting steel. The Baltimore & Ohio will sell 3250 tons of scrap on March 7.

Birmingham Operations Lower as Ensley Rail Mill, Open-Hearth Plant and Two Blast Furnaces End Run

BIRMINGHAM, March 1. — Sales and shipments of pig iron during February were both under the January totals. There is no improvement in the situation; bookings continue irregular and small. Operations of some stove plants have increased slightly, but pressure pipe manufacturers are still on restricted schedules. It is hoped that March will bring some kind of an improvement, but this will depend largely on pipe. A fair tonnage of pipe is in prospect and will be placed if bond issues can be financed. Pipe bookings this year to date have been comparatively small. There will be several changes this week in blast furnace operations. The Tennessee company will close down two blast furnaces at Ensley on account of the stoppage of rail mill operations. Woodward will again bank No. 2 furnace and at the same time take No. 1 off bank. Last week seven furnaces were in operation, three on foundry iron, three on basic and one on recarburizing iron.

Steel

The Ensley rail mill is being shut down this week. It is expected that operations will be resumed in April. The stoppage is in line with expectations, for when the mill was started on Jan. 4 it was generally understood that the probable run would be about seven or eight weeks. General lines of steel have been holding a fairly steady rate, and bookings during the month were slightly in excess of those for January. However, mill operating schedules continue to depend from week to week on current orders. Eleven open-hearths were active last week, the same number as for several weeks. The Tennessee company operated four at Fairfield and five at Ensley; Gulf States Steel, two at Alabama City. The Ensley open-hearth plant will also be closed down this week, along with the rail mill and two blast furnaces.

Old Material

The market is almost at a standstill. Current requirements of the steel mills and foundries are very small and even contract shipments are uncertain.

Railroad Equipment

Norfolk & Western is building four 16,000-gal. tank cars at its Roanoke, Va., shops.

Wabash is inquiring for prices for installing air-conditioning equipment in five passenger cars.

Chicago, Rock Island & Pacific is asking for prices for installing air-conditioning equipment in five dining cars.

Southern Pacific has placed contract with Pullman Car & Mfg. Corpn. for installing air-conditioning equipment in 14 dining cars.

Pullman Car & Mfg. Corpn. has recalled 400 men to its Chicago shops. Work to be performed will consist of installing air conditioning equipment in passenger and dining cars for various railroads.

Chicago Mills Advance Prices $2 a Ton on Bars, Plates and Shapes

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CHICAGO, March 1.—The possibility of broader railroad purchases, the showing this week of new Ford cars and efforts to stabilize steel prices are the main factors in a market that otherwise is drab.

A local manufacturer of railroad supplies has resumed operations after a shutdown of a year, and more men have been called to railroad shops. Purchasing agents for the railroads are freer in their talk about buying, and one Western railroad is said to have a $2,000,000 program for buildings and bridges.

Reports are persistent that sales of Ford cars are more than satisfactory, though the public has as yet not seen the cars and prices are still to be named.

Local producers are quoting 1.70c. a lb., Chicago, on plates, shapes and bars. Cold-rolled strip is being marked up, and attempts are being made to get higher prices on bolts and nuts. The pig iron market still shows some variation, but there is evidence that stabilization is nearer at hand. Scrap is inclined to sell lower, though it is quite apparent that supplies of many grades are none too plentiful and that even a moderate increase in consumer demand would swing prices to higher levels.

Farm implement manufacturers have completed the bulk of their spring programs and tractor manufacture is lighter. Some units in this industry are still holding to moderate schedules in the manufacture of harvesting machinery.

Ingot output remains a shade under 24 per cent of capacity. Producers are inclined to believe that seasonal influences may soon bring better demand for sheets. Reinforcing bars will soon again be moving to road construction camps, and track work seems destined to expand in the near future.

Chicago mills, in an attempt to follow price stabilization program, have advanced prices of bars, plates and shapes $2 a ton.

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An increase in purchases by railroads seen as an early possibility.

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Ingot production in Chicago district is unchanged.

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Pig iron releases for March already larger than the total of February shipments.

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Pig Iron

Releases of Northern foundry iron for March are already larger than the total moved in February. Sales are quiet. Inquiry, some of which is old, totals about 15,000 tons. Prices still show variation, and the $16.50 quotation is in a measure nominal.

Bolts, Nuts and Rivets

Sellers of machine bolts, carriage, lag and plow bolts and nuts are marking prices up to 75 per cent off list. Shipments and sales show little variation in spite of curtailed production by the agricultural machinery group.

Rails and Track Supplies

Production of standard-section rails has again turned downward. It is reported that the Milwaukee Road may first buy only a part of the 16,000 tons which it has in mind for 1932 delivery. Immediate needs of the New York Central are now said to be between 50,000 and 60,000 tons, but no definite inquiry has come to Western mills. Track accessory departments are still holding fair schedules, though new orders, at 1500 tons, are light.

Cast Iron Pipe

The few projects that are before sellers are quiescent, some of them being delayed because of the condition of the bond market. Even carload orders are scarce, and private buying is at low ebb. Thus far, only a very few public utilities have made any move toward placing contracts. The only inquiry of size this week is for 16,000 ft. by Cedar Grove, Wis. Prices are nominal in a highly competitive and dull market.

Plates

The growing interest of municipalities in laying steel pipe is one of the new developments in this market. Demand for line pipe for gas and oil is dull, but the use of plates for small public pipe work is growing. A new project of this kind is at Greeley, Colo., where prices are being taken on 600 tons. Producers here have moved prices to the level of 1.70c. a lb., Chicago. Order books are not large, and so not a great quantity of plates is still to be shipped at prices near the 1.60c. level.

Structural Material

A marked improvement is noted in this market. Lettings are close to 2500 tons and fresh inquiries exceed 6000 tons. Not only are tonnages up, but this business is well scattered throughout most of the Middle Western territory. In addition to the above, there is close to 3000 tons of steel needed for World's Fair buildings, on which work will be started in the next four or five months. Shape prices are being raised to 1.70c. a lb., Chicago.

Sheets

New buying is slightly larger, but the growth in specifications is not yet sufficient to register in a marked way on rolling schedules. Sellers believe they sense a broader interest in this market, a result in some measure of mild weather, which favors outdoor construction work. Second quarter prices have not yet been announced, but the tendency is toward higher quotations.

Bars

Demand still holds above the level of other finished steel products and also it is gradually expanding, which cannot be said of some of the other products. Local producers are naming 1.70c. a lb., Chicago, as their price on mild steel bars. Releases are slightly larger from automobile manufacturers, and it is generally believed here that more of this business is pending, to be released soon after Ford's showing of new models. The rail steel bar market is quiet and prices are steady.

Strip

Producers are naming 2c. a lb., Cleveland, or 2.30c., delivered Chicago, on cold-rolled strip. More business in all grades of strip is pending, but it is slow in materializing. Cold-rolled strip mills are producing at close to 20 per cent of capacity.

Reinforcing Bars

A few fresh inquiries and prospects for more State road work lend a better tone to this market. Illinois will take bids on highway work early this month. A sizable tonnage is to

be shipped as soon as construction can be started in the spring. Some dealers are expecting road slab steel releases in about three weeks. Rail steel reinforcement is now quoted 1.55c. a lb., warehouse, for all purposes.

Wire Products

Minor improvements are noted in new buying and specifications. The change affects most classifications of users. Prices remain steady. Present quotations have been reaffirmed for second quarter business.

Old Material

A small lot of heavy melting steel has been taken by a mill at $7, and hydraulic bundles are selling at $5.75 to $6.50, the lower price being on the larger tonnages. In a dull market, dealers are again turning their attention to boat movements. Cast iron borings are being accumulated and hydraulic bundles are also moving to a Chicago dock. A recent Chicago & North Western list showed only 1200 tons, indicating a decided shrinkage in available supplies.

Cincinnati Pig Iron Market Lacks Trend

CINCINNATI, March 1.—There is virtually no trend in the district pig iron market. New business the past week remained near the 1000-ton level and represented orders for immediate needs. A moderate improvement in the February melt brought shipments ahead of those of January. Prices on Southern iron continue firm, but competition outside of Cincinnati has contributed an undertone of uncertainty to Northern quotations. A Cincinnati melter is inquiring for 2500 tons of Southern iron.

Coke

A contract from a southern Ohio user for 8000 tons of by-product foundry coke was the only feature in the district market the past week.

Old Material

Shipments against contracts have slackened, but no new embargoes have been raised. Dealers are taking materials only as needed unless price concessions make purchases for storage advisable.

Detroit Scrap Market Showing More Strength

DETROIT, March 1.—In view of the imminence of a gain in steel mill operations based on prospective orders from the Ford Motor Co., sentiment in the local scrap trade is more cheerful. Open-hearth items in particular are showing strength, although quotations are the same as a week ago. Sales to consumers have been negligible.

Eastern Pennsylvania Market Shows a Small Improvement

Orders and Inquiries Gain but Not Sufficiently to Aid Operations —Railroads Buy for Repairs

PHILADELPHIA, March 1.—Slight improvement has occurred in both orders and inquiries for plates, shapes and bars. They are of a miscellaneous nature and come from several sources, chiefly from railroads for small repair work. Oil companies are expected to come in the market soon for fair lots of tank and quality steel for replacement of wornout tankage capacity.

The ambitious program announced by Henry Ford is looked to as likely to develop substantial steel business, which, in turn, it is hoped will stimulate better buying from other automotive makers.

Operations in this district again have slumped and are estimated to have fallen off one point to 17 per cent.

Considering actual business in sight, March does not promise to exceed February, which was under January. However, there is a feeling that the railroads and automotive industry will come into the markets more freely.

Pig Iron

There has been an increase in orders. They are still decidedly limited, however, both as to number and volume. Except for the sale of 500 tons of No. 2 plain iron to a nearby melter, business consists almost entirely of carlots of foundry iron. Prices are unchanged. Some concern is shown over incoming foreign iron, which is reported to be offered at 50 to 75c. under domestic iron. At the same time some domestic melters are reported to be showing favor to American iron even at higher prices in an effort to encourage home trade and assist in its recovery. Domestic iron is also preferred because of an assured source of supply.

Plates, Shapes and Bars

Improvement in orders and inquiries is reported. The business is coming from miscellaneous sources in small lots, insufficient to change the rate of production. Railroads are the chief buyers, releasing tonnages for repair work for the most part. Oil companies are manifesting more interest in the market and indicate they soon will place business for tank and quality material, much of the tank tonnage to be used in replacing wornout equipment. The effort to stabilize prices is said by some mill interests to have been welcomed by buyers. It is also reported by them to have developed more liberal specifications against contracts. Other makers have not noted any change in buyer interest.

Sheets

The market remains quiet and has made no particular response to the effort to move up prices. Manufacturers report that they are adhering to the higher quotations on new business. It is the hope of the trade that the Ford 1932 program will bring out a stimulating buying movement.

Warehouse Business

Jobbers report no change in the volume of business. March is expected to show an improvement over February. Prices are unchanged.

Imports

Imports last week were: Pig iron from the Netherlands, 57 tons; charcoal iron bars from Sweden, 27 tons; bearing bars from Sweden, 30 tons; bearing tubing from Sweden, 39 tons; steel bars from Sweden, 38 tons; steel bars from Belgium, 20 tons; steel bands from Belgium, 1 ton; structural shapes from Belgium, 68 tons; galvanized steel strips from England, 7 tons.

Old Material

The market continues to drag. Mills are not releasing tonnages and there is an almost complete absence of inquiries. Prices are stationary.

Cast Iron Pipe

Providence Gas Co., Providence, R. I., has awarded 400 tons of gas pipe to American Cast Iron Pipe Co.

Newton, Mass., closed bids on 400 tons of 6 to 12-in.

Gloucester, Mass., awarded 275 tons of 6 and 8-in. to Warren Pipe Co. of Mass.

Lynn Gas Co., Lynn, Mass., awarded 150 tons of gas pipe to R. D. Wood & Co.

Cambridge, Mass., awarded 100 tons of 6-in. and larger to Warren Pipe Co. of Mass.

Gardner, Mass., awarded 100 tons of 6 and 8-in. to R. D. Wood & Co.

Albany, N. Y., awarded 600 tons of 36 and 48-in. to Warren Foundry & Pipe Corpn.

Cedar Grove, Wis., will close bids March 11 on 7000 ft. of 8-in. and 7555 ft. of 6-in., class C, and 26 hydrants.

Sunnyvale, Cal., purchased 250 tons of 6, 8 and 16-in. from American Cast Iron Pipe Co. through Meyer Rosenberg, general contractor.

San Francisco awarded 1330 tons of 6 and 8-in. for city water department to United States Pipe & Foundry Co.

Signal Hill, Cal., awarded 1000 tons of 20-in. to American Cast Iron Pipe Co.

Kittitas, Wash., passed $30,000 bond issue calling for 133 tons of 4 and 6-in.

Cleveland Mills Experience Slight Recession in Orders

Ford Sheet Tonnage Reported to Have Been Placed, but Releases Have Not Been Issued—Bar Price Higher

CLEVELAND, March 1.—Steel business in this territory in February showed a moderate gain over that of January. However, there has been a slight recession in orders during the past few days. This is evidently due in part to lack of new demand from the motor car industry and to instructions from some of the automobile parts manufacturers to defer steel shipments, reflecting a slowing down in production schedules by a few of the motor car manufacturers.

The Ford Motor Co. is understood to have placed a considerable tonnage of sheets, but as yet has given no releases. However, some substantial releases have come from the Ford company to parts manufacturers for small parts requiring little steel.

The increase in steel plant operations in Cleveland to 38 per cent of ingot capacity, reported last week, is being maintained this week.

There has been little test of the price advances recently announced, and buyers are showing hesitation in making commitments at the higher prices until they are definitely established. With an advance to 1.65c., Cleveland, for steel bars by a local mill, that price appears to have become established in this territory. Small lots of plates and shapes have been sold at the new 1.60c., Pittsburgh, price. However, many consumers are covered for the quarter at 1.50c. and the higher price will not be given a good test this month. There has been little test of the new sheet prices. One producer has announced that it will accept specifications against contracts for sheets and strip through March for delivery up to April 30. The present prices on semi-finished steel and the $37 price on wire rods have been reestablished for the second quarter, as have the 2.20c., Cleveland, price on manufacturers' wire, $1.95 a keg on nails and other present prices on wire products. The present 2c., Cleveland, price on cold-finished steel bars also has been reaffirmed for the coming quarter, this not being marked up with hot-rolled bars.

Pig Iron

February shipments by two producers were 25 per cent larger than those in January, one shipping more iron than since last June. A third furnace interest shipped the same amount of iron as during the previous month. February sales were lighter than those during January. Small-lot inquiry has improved during the last few days. An increase in shipments in March over February is expected by some producers. Prices are unchanged at $16, furnace, for foundry and malleable iron for Cleveland delivery and $15 for outside shipment. However, a portion of the freight is being absorbed for business outside of the immediate territory.

Sheets

While some small lots have been sold at the new prices, the volume of business has not been sufficient to establish the market at the advance. Several small-lot orders have been taken at 2.20c. for hot-rolled annealed and 2.85c. for galvanized. Whether producers will be able to stiffen up auto body sheets to 2.90c. has not been determined by round-lot sales. Business in this territory was light during the week, being confined to small scattered orders. There has been some deferring of shipments by stamping plants making automobile parts.

Semi-Finished Steel

A local mill has reaffirmed its present semi-finished steel prices for the second quarter, or $26 for sheet bars and slabs, $26 for large billets and $27 for small billets, and a Valley district mill has named $26 for sheet bars for the coming quarter. Forging quality billets are bringing $33, Ohio mill. Orders are for small lots as needed.

Bars, Plates and Shapes

A Cleveland mill has advanced steel bars $2 a ton to 1.65c., Cleveland, for current orders and the second quarter following a similar advance by Pittsburgh district producers and a Valley district mill has also made a similar advance. The market appears established at the new price, at which some sales have been made. However, it will not apply to much March business. A local producer is now asking 1.55c. for reinforcing bars, also an advance of $2 a ton. New demand continues slow. Inquiry in the structural field is light. Buffalo has placed two grade crossing elimination jobs requiring 2600 tons.

Strip Steel

At least two producers who announced the current price of 1.40c., Pittsburgh, for wide strip and 1.50c. for narrow for the second quarter have withdrawn those prices except for March shipment, and no prices are being named at present for the coming quarter. The withdrawal of the prevailing prices is taken to mean that an effort will be made to advance prices. Efforts are still being made to advance cold-rolled strip to 2c. for the second quarter.

Railroad Business

The Erie Railroad has placed the track fastenings for the 33,200 tons of rails it recently purchased. The orders, covering spikes, tie plates and bolts, were divided among several producers. The Nickel Plate Railroad expects to purchase its track fastenings late in the week. The 1.65c., Cleveland, bar price seems the only Cleveland price at present, and whatever business is being taken is going at that price.

Old Material

The scrap market is weaker in heavy melting steel grades owing to the absence of a local demand. Dealers are paying $6.75 to $7 for heavy melting steel for delivery in the Valley district, a decline of 50c. a ton. Increased freight rates on scrap shipments are falling on the producer. Very little scrap is being taken by Cleveland and Youngstown district mills. Automobile scrap lists for Michigan are considerably smaller than for February, indicating reduced production schedules.

Buffalo Foundries Expect Automobile Orders

BUFFALO, March 1.—February was an exceptionally dull month in pig iron. Producers are looking forward to betterment in March in view of the fact that many of the district foundries are expecting automobile orders. Two blast furnaces are in operation at the Lackawanna plant of Bethlehem; one Republic stack is on 24-hr. blast, and two Hanna stacks are in blast, one on merchant iron and one on Bessemer ferrosilicon.

Steel

Bethlehem's Lackawanna plant is operating five open-hearths; Republic Steel will start four open-hearths late this week; four open-hearths were operated up to Sunday. There is no change in the schedules at other plants.

Old Material

Reports are current that the principal consumer may not accept shipment on old orders until May. Open weather may bring navigation on the barge canal about March 15, permitting loaded barges now in New York to move west.

New York Central to Inquire for 50,000 Tons of Rails This Week

Irak Pipe Line, Calling for 250,000 Tons of Pipe, May Go Ahead—Sheet Mills Ask Extras for Small Lots

NEW YORK, March 1.—The New York Central rail inquiry for about 50,000 tons probably will be issued this week. No other rail inquiries from Eastern roads are imminent, though it is believed that the Pennsylvania will inquire soon. Pending the outcome of the investigation by the Department of Justice, no question as to the price of rails is at present being raised, it being the apparent intention of both producers and carriers to permit the Government inquiry to settle this question.

The Irak pipe line inquiry, which has been before the market from time to time over the past two years, is again very active, and it is believed that the project may now go ahead. Prices are being taken on 900 to 1350 miles of 12¾-in. pipe, about 250,000 tons, and it is probable that the tonnage will be divided between American and European mills, as the project is backed by both American and European oil companies. Lapweld, electric weld or seamless pipe will be acceptable.

One of the important items in the price stabilization program of the sheet producers is the promulgation of extras for less-than-carload lots. For less than 50 bundles the extra will be 35c. per 100 lb. and for more than 50 bundles, but less than a carload, the extra will be 25c. per 100 lb. These extras are subject to the usual commission of $2 a ton to jobbers on direct mill shipments. If the mills succeed in establishing these extras, a problem that has long disturbed the steel trade may be solved, namely, the selling of small lots at the price of carload lots. Under prevailing conditions, it is expensive for the mills to make up rolling schedules consisting of many small lots, and the charging of extras is an attempt to compensate for such increased costs.

Eastern plate mills, excepting Bethlehem, have made no price advances, but it is expected that they will do so shortly. The Pittsburgh mills are determined to obtain a minimum of 1.60c., Pittsburgh, on second quarter business in bars, plates and shapes, and are, in fact, quoting this price on current inquiries, though it is not likely that much business will be closed at the higher level until second quarter contracting has begun.

Sheet prices are being firmly quoted at the recently announced higher levels, but first quarter contract coverage at the former prices precludes the possibility of many sales at the new prices this month. However, on an inquiry from Sing Sing Prison for galvanized sheets all mills quoted 2.85c., Pittsburgh, but four jobbers, protected by first quarter contracts, quoted prices about $1 a ton lower.

Business in this district has not improved.

Pig Iron

Demand continues to lag, with total pending business less than 1000 tons. For the third consecutive week sales shrunk in volume, last week's bookings amounting to only 2000 tons, compared with 2500 tons the week before and 3000 tons two weeks ago. An inquiry for a fair-sized quantity of special analysis iron is understood to have been withdrawn. A consignment of Royal Dutch iron, which is still unsold, is expected to arrive at New York late in March. Prices on domestic iron are unchanged and untested in the extremely dull market.

The Ford Motor Co. is inquiring for 500 tons of high carbon ferrochrome and a carload of silico-ferromanganese for March-April shipment.

Reinforcing Bars

Despite the light demand for bars, mills have intimated that efforts will soon be exerted to effect a $2 a ton advance to 1.60c., Pittsburgh, or 1.95c., delivered New York. With prospects of a seasonal improvement in construction activity in the spring, an advance is considered practically certain in the near future. Preliminary estimates indicate that about 500 tons of bars will be required for the Newark, N. J., post office and courthouse.

Old Material

Activity in the past two weeks has been practically at a standstill. A moderate movement of No. 1 heavy melting steel for barge shipment continues; otherwise, deliveries are generally suspended. In the absence of sales, all prices are nominally unchanged.

St. Louis Buys Small Lots of Pig Iron for Second Quarter; Steel Prices Are Firmer

ST. LOUIS, March 1.—Better sentiment is reported to exist in the pig iron market, and during the week there was some buying for second quarter delivery, which is encouraging to makers, although the commitments were small. Jobbing foundries and specialty manufacturers report some improvement in demand for their products, but the stove business is dull. Prices are unchanged, and the tone of the market is firm.

Finished Steel

The market for plates, shapes and bars has strengthened considerably on the news of the advance of $2 a ton at Pittsburgh for second quarter. A leading Eastern mill has notified its representative here to withdraw all concessions below 1.60c. f.o.b. Chicago. One result of the strengthening of the market has been to stimulate specifications of tonnages for bridges for highway projects which already had been let.

Granite Steel Co. reports that its sales in February were ahead of the same number of days in January, which exceeded December.

The Kansas City Southern Railway is said to have placed an order with the Scullin Steel Co. for approximately 500 tons of tie plates. The American Railway Co. of Porto Rico is in the market for 1600 tons of 60-lb. rails.

The Ingalls Iron Works is low bidder on 1100 tons of structural steel for a library building for the University of Texas at Austin.

Old Material

Business with consumers of old material in the St. Louis industrial district is reported to be improving, but so far it has not stimulated any buying of scrap iron from dealers. Sales of heavy turnings and steel rail at 50c. below previous transactions caused dealers to cut their prices accordingly. Railroad lists: Pennsylvania, 20,920 tons; Union Pacific, 5175 tons; New York Central, 145 carloads, and Missouri Pacific, 55 carloads.

New England Pig Iron Sales at Low Point

BOSTON, March 1—Pig iron sales dropped to almost nothing the past week, virtually all furnace representatives reporting no bookings. There are no open inquiries, and the outlook for business is not bright. Some foundries which bought iron early in 1931 continue to ask furnaces to hold up shipments.

Old Material

The scrap market continues to drag. Brokers have virtually no orders for shipment to Pittsburgh or to Worcester, Mass.

Fabricated Structural Steel

New Projects of 26,200 Tons, Awards 19,200 Tons—Largest Totals This Year

LETTINGS of fabricated structural steel were the heaviest for any week since Dec. 31, totaling 19,200. Outstanding awards were 4090 tons for overhead construction in Cook County, Ill., 2900 tons for a post office in Atlanta and 2800 tons for a pier shed in New York. New jobs will require 26,200 tons, the largest volume, with one exception, since the week of Dec. 3. Of this tonnage, almost one-half is for post office buildings in various sections of the country. Contracts in February, at 40,500 tons, compare with 40,061 tons in January and 88,600 tons in December. Awards follow:

NORTH ATLANTIC STATES

New York, 2800 tons, pier shed No. 34, Clyde-Mallory Lines, to McClintic-Marshall Corpn.

Frankfort, Me., 115 tons, mill building extension, to American Bridge Co.

Buffalo, 2595 tons, grade crossing elimination, to McClintic-Marshall Corpn.

New Castle County, Del., 120 tons, workhouse, to Belmont Iron Works.

Polk, Pa., 405 tons, infirmary building, to Guibert Steel Co.

Pittsburgh, 430 tons, Presbyterian Church, to McClintic-Marshall Corpn.

Philadelphia, 100 tons, addition to Girard College Library, to Belmont Iron Works.

Washington, 230 tons, beacon towers for Department of Commerce, to International-Stacey Corpn.

SOUTH AND SOUTHWEST

State of West Virginia, 355 tons, transmission towers for New Kanawha Power Co., to American Bridge Co.

Atlanta, Ga., 2900 tons, post office, to Wheeling Structural Steel Co.

State of Oklahoma, 100 tons, highway bridge, to Capitol Steel & Iron Co.

Oklahoma City, 300 tons, coliseum, to Capitol Steel & Iron Co.

Atoka, Okla., 200 tons, highway bridge, to Kansas City Structural Steel Co.

Picher, Okla., 250 tons, buildings for Eagle-Picher Lead Co., to Muskogee Iron Works.

Carlsbad, N. M., 150 tons, bridge to Kansas City Structural Steel Co.

CENTRAL STATES

Diamondale, Mich., 135 tons, highway bridge, to McClintic-Marshall Corpn.

Swan Creek, Mich., 260 tons, highway bridge, to Lackawanna Steel Construction Co.

Cincinnati, 180 tons, two turntables for Cincinnati Union Terminal Corpn., to McClintic-Marshall Corpn.

Savanna, Ill., 1380 tons, highway bridge, to Clinton Bridge Works, Clinton, Iowa.

Milwaukee Road, 150 tons, bridge girders, to McClintic-Marshall Corpn.

State of Illinois, 4090 tons, Manheim overhead construction in Cook County, to McClintic-Marshall Corpn.

Kaukauna, Wis., 100 tons, mill addition for Thilmany Pulp & Paper Co., to Worden-Allen Co.

Milwaukee, 100 tons, foundry addition for Filer & Stowell Co., to Lakeside Bridge & Steel Co.

Cleveland, 200 tons, addition for Industrial Rayon Corpn., to Fort Pitt Bridge Works Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Belvidere, N. Y., 200 tons, highway bridge for Erie Railroad.

Newark, N. J., 8000 tons, post office; reported last week as 5500 tons.

Philadelphia, 250 tons, Episcopal Church hospital.

Washington, 8000 tons, addition to post office.

Salem, Pa., 300 tons, Mannington mills; Industrial Contractors' Co., Philadelphia, general contractor.

SOUTH AND SOUTHWEST

Austin, Tex., 1100 tons, library building for University of Texas, Ingalls Iron Works low bidder.

Carlsbad, N. M., 900 tons, mill building for United States Potash Co.

CENTRAL STATES

Akron, Ohio, 250 tons, garage.

McCook, Neb., 3000 tons, highway bridge.

Rockford, Ill., 500 tons, post office.

Rock County, Wis., 1200 tons, highway bridges.

Sioux City, Iowa, 700 tons, post office.

Bismarck, N. D., 2000 tons, unnamed project.

Jackson, Mich., 250 tons, post office.

St. Paul, Minn., 1000 tons, first section of post office.

WESTERN STATES

Oregon City, Ore., 1000 tons, State highway bridge.

Wilmington, Cal., 1900 tons, power station for Los Angeles Bureau of Power & Light.

Pico, San Luis Obispo County, Cal., 550 tons, County bridge.

Knights Landing, Cal., 800 tons, double leaf bascule County bridge.

San Francisco, 1200 tons, addition to University of California medical school.

FABRICATED PLATES

AWARDS

New York, 2045 tons, tanks for Standard Oil Co. of New York, to McClintic-Marshall Corpn.

Sunnyvale, Cal., 500 tons, 85 helium tanks for naval dirigible base, to A. O. Smith Corpn.

NEW PROJECTS

New York, 1000 tons, steel plates for Prest-O-Lite Co.

Galveston, Tex., 200 tons, dredge boat Sam Houston for United States Engineer.

St. Louis, 340 tons, 20 pontoons for United States Engineer; bids March 19, reported last week as 200 tons.

Pacific Coast Steel Inquiries Are Larger; Price Advances Will Benefit Foreign Steel

SAN FRANCISCO, Feb. 29.—Tentative specifications have been released by the Southern Pacific Co. calling for bids on 20,675 tons of rails for delivery during the year, comprising the company's estimated requirements on its Pacific system during 1932. It is understood that part of last year's contracted tonnage is yet to be taken up, and that replacement of roadbed and laying of new trackage during the coming year will be held within restricted limits.

Although the release of new mill prices c.i.f. Pacific Coast ports has been delayed until the higher intercoastal ocean freight rates go into effect March 1, it is generally understood in the trade that the advance will be approximately $3 a ton. New schedules on sheets informally announced reflect this increase approximately, with minor adjustment. Since the freight advance does not apply to carriers of cargo from European ports, foreign steel will benefit by this advance in the Pacific Coast market.

The Pacific Gas & Electric Co. is in the market for 1200 tons of plates that will be required for fabrication of 42 miles of 26-in. line pipe for a new natural gas main from the Milpitas sub-station to San Francisco, following a westerly route on higher ground up the peninsula in Santa Clara and San Mateo counties and tapping new suburban area. Construction on this line will proceed during the spring and summer.

The Union Pacific Railroad will require 5000 tons of shapes for its 1932 bridge program, and call for bids will be issued from Omaha headquarters, though delivery and erection are largely in California and Nevada.

Approximately 3000 tons of shapes, bars and plates were awarded on major projects during the past week, and an additional 2600 tons of cast iron pipe on three large contracts at Signal Hill, Sunnyvale and San Francisco, Cal. New inquiries are the largest for several weeks, with over 7300 tons estimated for future definite projects. Bids will be opened during the coming week for the Sacramento Post Office, which will require 1100 tons of shapes and from 350 to 600 tons of reinforcing bars.

Pipe Lines

Tacoma, Wash., plans installation of 6280 ft. of 42-in. electric-welded steel pipe, 3590 ft. of 42-in., and 1880 ft. of 30-in. in connection with extensions and improvements in waterworks. Entire project will cost over $300,000.

Old Dutch Refining Co., Muskegon, Mich., is considering construction of 4-in. oil pipe line from Mount Pleasant-Midland oil field district to Muskegon and vicinity, about 100 miles. Cost over $400,000.

Shell Petroleum Corpn., St. Louis, and Continental Oil Co., Denver, have work under way on 4-in. pipe line from oil fields in Reno County, Kan., southwest to connection with system of Skelly Oil Co., Tulsa, Okla. Cost over $85,000.

Pacific Gas & Electric Co. is inquiring for 1200 tons of 26-in. pipe for natural gas line from Milpitas sub-station to San Francisco.

Signal Hill, Cal., awarded 600 tons of 18-in. pipe to Los Angeles Mfg. Co.

Kansas City, Mo., awarded 100 tons of steel pipe to Kansas City Structural Steel Co.

Greeley, Colo., is in the market for 600 tons for a pipe line.

Minneapolis, Minn., Water Department has awarded 22,000 ft. of 36 and 42-in. lock-bar pipe to the East Jersey Pipe Co., New York. About 2000 tons of plates and bars will be required.

▲▲▲ Prices of Finished and Semi-Finished Steel,

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.60c. to 1.70c.
Del'd Philadelphia	1.81c. to 1.91c.
Del'd New York	1.85c. to 1.95c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.60c. to 1.70c.
F.o.b. Birmingham	1.70c.
C.i.f. Pacific ports	2.00c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.50c. to 1.60c.
F.o.b. Birmingham, mill lengths	1.75c.
F.o.b. Cleveland	1.50c. to 1.55c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c. to 1.35c.
F.o.b. Chicago Heights mills	1.50c. to 1.60c.
Del'd Philadelphia	1.49c. to 1.59c.

Iron

Common iron, f.o.b. Chicago	1.70c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.11c.
Common iron, del'd New York	2.15c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.60c. to 1.70c.
F.o.b. Birmingham	1.70c.
Del'd Cleveland	1.7035c. to 1.8035c.
Del'd Philadelphia	1.6935c. to 1.7435c.
F.o.b. Coatesville	1.60c. to 1.65c.
F.o.b. Sparrows Point	1.60c. to 1.70c.
F.o.b. Lackawanna	1.60c. to 1.70c.
Del'd New York	1.798c. to 1.898c.
C.i.f. Pacific ports	1.80c. to 1.85c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.60c. to 1.70c.
F.o.b. Birmingham	1.70c.
F.o.b. Lackawanna	1.60c. to 1.70c.
F.o.b. Bethlehem	1.60c. to 1.70c.
Del'd Cleveland	1.7035c. to 1.8035c.
Del'd Philadelphia	1.5995c. to 1.6495c.
Del'd New York	1.76775c. to 1.86775c.
C.i.f. Pacific ports (standard)	2.05c.
C.i.f. Pacific ports (wide flange)	2.15c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential per 100 Lb.
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold-Finished Bars

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.00c.
Bars, f.o.b. Chicago	2.00c.
Bars, Cleveland	2.00c.
Bars, Buffalo	2.00c.
Shafting, ground, f.o.b. mill	*2.35c. to 3.30c.

*According to size.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.55c. to 1.60c.
No. 10, f.o.b. Chicago mill	1.65c. to 1.70c.
No. 10, del'd Philadelphia	1.86c. to 1.96c.
No. 10, f.o.b. Birmingham	1.70c. to 1.80c.
No. 10, c.i.f. Pacific Coast ports	2.35c.

Hot-Rolled and Annealed

No. 10, Pittsburgh	1.70c. to 1.75c.
No. 10, Chicago mills	1.80c. to 1.85c.
No. 10, Birmingham	1.85c. to 1.90c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.15c. to 2.20c.
No. 24, f.o.b. Chicago mills	2.25c. to 2.30c.
No. 24, del'd Philadelphia	2.46c. to 2.51c.
No. 24, f.o.b. Birmingham	2.35c. to 2.50c.
No. 24, c.i.f. Pacific Coast ports	2.90c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.10c. to 2.25c.
No. 10 gage, f.o.b. Chicago mills	2.20c. to 2.35c.
No. 10 gage, del'd Philadelphia	2.41c. to 2.46c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 20 gage, f.o.b. Chicago mills	2.75c. to 2.85c.
No. 20 gage, del'd Philadelphia	2.96c. to 3.06c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	2.80c. to 2.90c.

Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh	2.50c. to 2.65c.
No. 20, f.o.b. Pittsburgh	2.95c. to 3.15c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.75c. to 2.85c.
No. 24, f.o.b. Chicago mills	2.85c. to 2.95c.
No. 24, del'd Philadelphia	3.06c. to 3.16c.
No. 24, f.o.b. Birmingham	2.95c. to 3.00c.
No. 24, c.i.f. Pacific Coast ports	3.40c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh	3.00c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.60c.
No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 28, Chicago mill	2.50c. to 2.60c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	$4.75
Standard cokes, f.o.b. Gary	4.85

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $9.50	25-lb. coating I.C. $14.10
15-lb. coating I.C. 12.00	30-lb. coating I.C. 14.90
20-lb. coating I.C. 13.00	40-lb. coating I.C. 16.70

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, Pittsburgh	1.50c. to 1.55c.
Wider than 6 in., P'gh	1.40c. to 1.45c.
6 in. and narrower, Chicago	1.60c. to 1.65c.
Wider than 6 in., Chicago	1.50c. to 1.55c.
Cooperage stock, P'gh	1.60c. to 1.70c.
Cooperage stock, Chicago	1.70c. to 1.80c.

Cold-Rolled Strips

F.o.b. P'gh	1.90c. to 2.00c.
F.o.b. Cleveland	1.85c. to 2.00c.
Del'd Chicago	2.20c. to 2.30c.
F.o.b. Worcester	2.05c. to 2.15c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.85c. to 3.00c.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+9	+34
¼ to ⅜	53	27½	½	25	7
½	58	44½	¾	30	13
¾	62	50½	1 and 1¼	33	17
1 to 3	64	52½	1½ and 2	37	20

Lap Weld

2	57	45½	2	25	11
2½ to 6	61	49½	2½ to 3½	30	15
7 and 8	58	45½	4 to 6	32	19
9 and 10	56	43½	7 and 8	31	18
11 and 12	55	42½	9 to 12	28	13

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+11	+46
¼ to ⅜	49	32½	½	25	9
½	55	44½	¾	30	14
¾	60	49⅞	1 to 2	36	20
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	31	15
2½ to 4	59	48½	2½ to 4	36	22
4½ to 6	58	47½	4½ to 6	35	21
7 to 8	54	41½	7 and 8	33	19
9 and 10	47	34½	9 to 12	23	10
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Bolts, Nuts, Coke, Coal, Fuel Oil, Cast Iron Pipe

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)
(After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.95
Smooth coated nails	1.95
Galvanized nails	3.90

	Base per Lb.
Smooth annealed wire	2.35c.
Smooth galvanized wire	2.80c.
Polished staples	2.50c.
Galvanized staples	2.75c.
Barbed wire, galvanized	2.60c.
Woven wire fence, No. 9 gage, per net ton	$55.00
Woven wire fence, No. 12½ gage and lighter, per net ton	60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝-in. and larger	$2.60
Spikes, ½-in. and larger	2.60
Spikes, boat and barge	2.80
Tie plate, steel	1.85
Angle bars	2.75
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	75
†Carriage bolts	75
Lag bolts	75
Plow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagons	75
C.p.c. and t. square or hex. nuts, blank or tapped	75
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Stove bolts in packages, P'gh	85 and 10
Stove bolts in packages, Ch'go	85 and 10
Stove bolts in pkgs., Cleveland	85 and 10
Stove bolts in bulk, P'gh	85, 10 and 2½
Stove bolts in bulk, Ch'go	85, 10 and 2½
Stove bolts in bulk, Cleveland	85, 10 and 2½
Tire bolts	60, 10 and 10

Discounts of 73, 10 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread	85, 10 and 10
Upset hex. cap screws, S.A.E. thread	85, 10 and 10
Upset set screws	80, 10 and 5
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$27.00
Rerolling, 4-in. and under 10-in., Youngstown	27.00
Rerolling, 4-in. and under 10-in., Cleveland	$26.00 to 27.00
Rerolling, 4-in. and under 10-in., Chicago	29.00
Forging quality, Pittsburgh	$33.00 to 34.00
Forging quality, Youngstown	33.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00 to $27.00
Youngstown	26.00
Cleveland	26.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$27.00
Youngstown	27.00
Cleveland	26.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.50c. to 1.60c.
Universal	1.50c. to 1.60c.
Sheared	1.50c. to 1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.25
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.50
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila	9.00
Foundry, by-product, Cleveland, delivered	8.27
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, ¾-in., f.o.b. Pa. mines	$1.70 to $1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.40 to 0.60
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	3.50c.
No. 4 industrial	3.00c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	3.50c.
No. 4 industrial	3.25c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	2.75c.
No. 5 industrial fuel oil	2.60c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	4.75c.
No. 4 distillate	4.00c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$38.00	$25.00 to $30.00
Maryland	38.00	25.00 to 30.00
New Jersey	$44.00 to 57.00	
Ohio	38.00	25.00 to 30.00
Kentucky	38.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	38.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$40.40 to $41.40
4-in., del'd Chicago	43.40 to 44.40
6-in. and larger, del'd New York	$29.20
4-in., del'd New York	32.20
6-in. and larger, Birmingham	$32.00 to 33.00
4-in., Birmingham	$35.00 to $36.00

Class "A" and gas pipe, $3 extra.

Pig Iron Prices for All Districts

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	$14.50
Bessemer	15.50
Gray forge	15.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.50
Low phos., copper free	25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$15.00
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.00
Bessemer	16.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$16.50
N'th'n No. 1 fdy.	17.00
Malleable, not over 2.25 sil.	16.50
High phosphorus	16.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
S'th'n No. 2 fdy.	16.14
Low phos., sil. 1 to 2, copper free	$28.50 to 29.20
Silvery, sil. 8 per cent	23.67
Bess. ferrosilicon, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., del'd St. Louis	18.80
Southern No. 2 fdy., del'd	$14.56 to 15.56
Northern malleable, deliv'd	18.80
Northern basic, deliv'd	18.80

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east. N. J.	$17.91 to $18.41
East. Pa. No. 2 fdy.	17.02 to 17.52
East. Pa. No. 2X fdy.	17.52 to 18.02

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$20.04
*Buffalo, sil. 2.25 to 2.75	20.04
*Ala., sil. 1.75 to 2.25	19.74
*Ala., sil. 2.25 to 2.75	20.24
†Ala., sil. 1.75 to 2.25	15.88
†Ala., sil. 2.25 to 2.75	16.28

Freight rates: $5.04 all rail from Buffalo; $9.75 all rail from Alabama and $5.88 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	$17.27 to 17.52
S'th'n Ohio silvery, 8 per cent	22.01

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.81 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$15.64 to $16.14
East. Pa. No. 2X	16.14 to 16.64
East. Pa. No. 1X	16.64 to 17.14
Basic (del'd east. Pa.)	16.00
Malleable	18.00 to 18.50
Stand. low phos. (f.o.b. east. Pa. furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 22.50
Va. No. 2 plain	22.04
Va. No. 2X	22.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$16.00
S'th'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	16.00
Ohio silvery, 8 per cent	21.87
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 55c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Prices of Ores, Ferroalloys and Fluorspar

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, aver. 68% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic and foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	22c. to 23c.
Tungsten, Chinese wolframite	$11.00 to $11.25
Tungsten, domestic scheelite	9.50 to 10.00

	Per Gross Ton
Chrome, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$18.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic seaboard	20.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	*$72.00 to $75.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*72.00 to 75.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$26.00 to $27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (less carload)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b. Welland, Ont., in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$20.50	14%	$23.50
11%	21.00	15%	24.00
12%	21.50	16%	25.00
13%	22.50	17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$18.00	12%	$20.50
7%	18.50	13%	21.50
8%	18.75	14%	22.50
9%	19.00	15%	23.00
10%	19.50	16%	24.00
11%	20.00	17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	23.50c. to 25.00c.
Ferrochromium, 0.06% carbon	25.50c. to 27.00c.
Ferrovanadium, del., per lb. contained Va.	$3.05 to $3.30
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered: 2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	$20.31
No. 2 lump, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	22.31
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$17.00 to 17.10
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.00

Old Material Quotations

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to	$10.50
No. 2 heavy melting steel	9.00 to	9.50
No. 2 railroad wrought	10.00 to	10.50
Scrap rails	10.00 to	10.50
Rails 3 ft. and under	12.00 to	12.50
Sheet bar crops, ordinary	11.00 to	11.50
Compressed sheet steel	9.50 to	10.00
Hand bundled sheet steel	8.50 to	9.00
Hvy. steel axle turnings	9.00 to	9.50
Machine shop turnings	6.50 to	7.00
Short shov. steel turnings	6.50 to	7.00
Short mixed borings and turnings	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Cast iron carwheels	10.50 to	11.00
Heavy breakable cast	8.00 to	8.50
No. 1 cast	9.50 to	10.00
Railr. knuckles and couplers	10.50 to	11.50
Rail. coil and leaf springs	10.50 to	11.50
Rolled steel wheels	10.50 to	11.50
Low phos. billet crops	13.00 to	13.50
Low phos. sheet bar crops	12.50 to	13.00
Low phos. plate scrap	10.50 to	11.50
Low phos. punchings	10.50 to	11.50
Steel car axles	15.00 to	15.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$7.00 to	$7.25
Shoveling steel	7.00 to	7.25
Frogs, switches and guards	7.00 to	7.25
Hydraulic comp. sheets	5.75 to	6.25
Drop forge flashings	5.00 to	5.50
No. 1 busheling	5.00 to	5.50
Rolled carwheels	7.75 to	8.25
Railroad tires	9.00 to	9.50
Railroad leaf springs	8.50 to	9.00
Axle turnings	5.75 to	6.25
Steel couplers and knuckles	8.25 to	8.75
Coil springs	9.50 to	10.00
Axle turnings (elec. fur.)	6.00 to	6.50
Low phos. punchings	9.50 to	10.00
Low phos. plates, 12 in. and under	9.00 to	9.50
Cast iron borings	4.50 to	5.00
Short shoveling turnings	4.50 to	5.00
Machine shop turnings	4.00 to	4.50
Rerolling rails	10.25 to	10.75
Steel rails, less than 3 ft	9.25 to	9.75
Steel rails, less than 2 ft	10.00 to	10.50
Angle bars, steel	8.25 to	8.75
Cast iron carwheels	6.50 to	7.00
Railroad malleable	7.25 to	7.75
Agricultural malleable	6.50 to	7.00
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relay. rails, 65 lb. and up	22.00 to	27.00

Per Net Ton

Iron angle and splice bars	$7.00 to	$7.50
Iron arch bars, transoms	7.00 to	7.50
Iron car axles	13.00 to	14.00
Steel car axles	10.00 to	10.50
No. 1 railroad wrought	5.50 to	6.00
No. 2 railroad wrought	6.25 to	6.50
No. 1 busheling	4.75 to	5.25
No. 2 busheling	2.50 to	3.00
Locomotive tires, smooth	8.00 to	9.00
Pipes and flues	3.25 to	3.75
No. 1 machinery cast	7.50 to	8.00
Clean automobile cast	7.25 to	7.75
No. 1 railroad cast	6.00 to	6.50
No. 1 agricultural cast	6.25 to	6.75
Stove plate	5.75 to	6.25
Grate bars	5.50 to	6.00
Brake shoes	6.50 to	7.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.75
No. 2 heavy melting steel	5.50 to	6.00
No. 1 railroad wrought	8.50 to	9.00
Bundled sheets		6.00
Hydraulic compressed, new	6.50 to	7.00
Hydraulic compressed, old	5.50 to	6.00
Machine shop turnings	4.00 to	4.50
Heavy axle turnings	6.00 to	6.50
Cast borings (nom.)		3.50
Heavy breakable cast		9.00
Stove plate (steel works)		7.00
No. 1 low phos. hvy	10.00 to	11.00
Couplers and knuckles	8.50 to	9.00
Rolled steel wheels	8.50 to	9.00
No. 1 blast furnace		3.50
Spec. iron and steel pipe		10.50
Shafting	13.50 to	14.00
Steel axles	14.50 to	15.00
No. 1 forge fire		6.00
Cast iron carwheels	10.00 to	10.50
No. 1 cast	10.00 to	10.50
Cast borings (chem.)	11.50 to	12.00
Steel rails for rolling		10.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.50
No. 2 heavy melting steel	6.50 to	7.00
Compressed sheet steel	7.00 to	7.25
Light bundled sheet stampings	6.00 to	6.50
Drop forge flashings	6.00 to	6.25
Machine-shop turnings	4.25 to	4.50
Short shoveling turnings	5.75 to	6.25
No. 1 busheling	6.50 to	6.75
Steel axle turnings	7.50 to	8.00
Low phos., billet crops	14.00 to	14.50
Cast iron borings	5.75 to	6.00
Mixed borings and short turnings	5.75 to	6.00
No. 2 busheling	5.75 to	6.00
No. 1 cast	9.00 to	9.50
Railroad grate bars	6.00 to	6.50
Stove plate	6.00 to	6.50
Rails under 3 ft	12.00 to	12.50
Rails for rolling	11.00 to	12.00
Railroad malleable	9.50 to	10.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel		$8.00
No. 2 heavy melting scrap		6.50
Scrap rails	$8.00 to	8.50
New hydraul. comp. sheets		6.50
Old hydraul. comp. sheets		5.50
Drop forge flashings		6.50
No. 1 busheling	6.50 to	7.00
Hvy. steel axle turnings	7.00 to	7.50
Machine shop turnings		5.00
Knuckles and couplers		10.00
Coil and leaf springs		10.00
Rolled steel wheels		10.00
Low phos. billet crops	12.00 to	12.50
Short shov. steel turnings	6.50 to	7.00
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	12.00 to	12.50
No. 1 machinery cast	9.25 to	9.75
No. 1 cupola cast	8.75 to	9.00
Stove plate	8.25 to	8.75
Steel rails, 3 ft. and under	11.50 to	12.00
Cast iron carwheels	9.00 to	9.50
Industrial malleable	9.00 to	9.50
Railroad malleable	9.00 to	9.50
Chemical borings	8.50 to	9.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.50 to	$8.00
Scrap steel rails	8.00 to	8.50
Short shoveling turnings	3.50 to	4.00
Stove plate		6.00
Steel axles		12.00
Iron axles		12.00
No. 1 railroad wrought		6.00
Rails for rolling	9.00 to	9.50
No. 1 cast		9.00
Tramcar wheels		8.50
Cast iron borings, chem		8.50

ST. LOUIS

Dealers' buying prices per gross ton:

Selected heavy steel	$7.00 to	$7.50
No. 1 heavy melting	6.25 to	6.75
No. 2 heavy melting	5.75 to	6.25
No. 1 locomotive tires	6.50 to	7.00
Misc. stand-sec. rails	7.50 to	7.75
Railroad springs	8.50 to	9.00
Bundled sheets	4.25 to	4.75
No. 2 railroad wrought	6.25 to	6.75
No. 1 busheling	5.75 to	6.25
Cast iron borings and shoveling turnings	4.75 to	5.25
Iron rails	7.00 to	8.00
Rails for rolling	9.25 to	9.75
Machine shop turnings	3.00 to	3.50
Heavy turnings	5.00 to	5.50
Steel car axles	9.50 to	10.00
Iron car axles	14.00 to	14.50
Wrot. iron bars and trans.	5.00 to	5.50
No. 1 railroad wrought	4.75 to	5.25
Steel rails, less than 3 ft	9.50 to	10.00
Steel angle bars	6.50 to	7.00
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	8.00 to	8.50
Railroad malleable	5.00 to	5.50
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	5.00 to	5.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$4.25 to	$5.50
No. 2 heavy melting steel	3.75 to	4.50
Heavy melting steel (yard)	2.75 to	3.00
No. 1 hvy. breakable cast	5.00 to	5.50
Stove plate (steel works)	3.00 to	3.50
Machine shop turnings	1.00 to	1.50
Short shoveling turnings	1.00 to	1.50
Cast borings	1.00 to	1.50
No. 1 blast furnace	1.00 to	1.50
Steel car axles	10.00 to	10.50
Iron car axles (nom.)	14.00 to	14.50
Spec. iron and steel pipe		5.00
Forge fire		3.25
No. 1 railroad wrought	5.00 to	5.25
No. 1 yard wrought, long	4.00 to	4.25
Rails for rolling	6.00 to	6.25
Stove plate (foundry)	4.75 to	5.25
Malleable cast (railroad)	6.00 to	6.50
Cast borings (chemical)	8.00 to	8.50

Per gross ton, delivered local foundries:

No. 1 machinery cast	$8.50
No. 1 hvy. cast (cupola size)	7.50
No. 2 cast	6.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$4.00 to	$4.25
Scrap T rails	3.80 to	4.60
Machine shop turnings		1.05
Cast iron borings		1.05
Bundled skeleton, long		2.50
Forge flashings	3.00 to	3.50
Blast furnace scrap		1.05
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	6.00 to	6.50
Cast iron borings, chemical	7.00 to	7.25

Per gross ton delivered consumers' yards:

Textile cast	$8.75 to	$9.25
No. 1 machinery cast	8.75 to	9.25
Stove plate	5.00 to	5.25
Railroad malleable	10.50 to	11.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$6.00 to	$7.00
Scrap rails for melting	8.00 to	8.50
Loose sheet clippings	2.25 to	2.75
Bundled sheets	4.75 to	5.25
Cast iron borings	2.75 to	3.25
Machine shop turnings	3.25 to	3.75
No. 1 busheling	4.25 to	4.75
No. 2 busheling	2.50 to	3.00
Rails for rolling	9.00 to	9.50
No. 1 locomotive tires	8.50 to	9.00
Short rails	11.75 to	12.25
Cast iron carwheels	8.25 to	8.75
No. 1 machinery cast	10.00 to	10.50
No. 1 railroad cast	8.75 to	9.25
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Agricultural malleable	8.00 to	8.50
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting	$5.75 to	$6.25
Borings and short turnings	4.00 to	4.50
Long turnings	3.25 to	3.75
No. 1 machinery cast	8.50 to	9.00
Automotive cast	10.75 to	11.25
Hydraul. comp. sheets	5.75 to	6.25
Stove plate	4.50 to	5.00
New No. 1 busheling	4.75 to	5.25
Old No. 2 busheling	3.00 to	3.50
Sheet clippings	3.25 to	3.75
Flashings	4.75 to	5.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	11.00	8.50
Malleable	10.00	8.00

▲▲▲ Warehouse Prices for Iron and Steel Products ▲▲▲

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.75c.
Rail steel reinforcement	1.55c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.10c.
Flats and squares	3.60c.
Bands, $\frac{7}{16}$ in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes ($\frac{7}{16}$ in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.

	Per Cent Off List
Machine bolts	73
Carriage bolts	73
Coach and lag screws	73
Hot-pressed nuts, sq., tap. or blank	73
Hot-pressed nuts, hex., tap. or blank	73
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex	3.10c.
Cold-fin. flats and sq.	3.60c.
Hoops and bands, No. 12 to $\frac{7}{8}$ in., inclusive	3.00c.
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip	*5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.75
No. 9 galv. wire, per 100 lb.	3.20
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex	3.50c.
Squares	4.00c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.50
4-in.	36.00
Lap-welded steel boiler tubes, 2-in.	16.50
4-in.	34.50

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.45
Black wire, base per 100 lb.	3.20

NEW YORK

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	6.00c. to 6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.60c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10

Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.00c.
Boiler rivets	4.00c.

	Per Cent Off List
Tank rivets, $\frac{7}{16}$-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	73
Carriage bolts	73
Lag screws	73
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	73
Less than 200 lb.	63
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	73
Less than 200 lb.	63

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates and struc. shapes, ¼-in. and heavier	2.80c.	3.00c.	2.50c.
Soft steel bars	2.80c.	3.00c.	2.50c.
Reinforcing bars	2.80c.	2.80c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.90c.	3.90c.	4.00c.
Hot-rolled sheets (No. 10)	3.40c.	3.35c.	3.50c.
Galv. sheets (No. 24)	4.40c.	4.20c.	4.50c.
Struc. rivets, ½ in. and larger, less than 1000 lb.	5.00c.	5.00c.	4.00c.
Cold-finished steel bars and shafting:			
Rounds	5.25c.	5.00c.	4.25c.
Square and hexagon	6.25c.	6.50c.	5.50c.
Flats	6.75c.	6.50c.	6.50c.
Common wire nails, base per keg in less carloads	$2.75	$2.75	$2.75

Plates, shapes, bars, bands and hot-rolled sheets, No. 16 gage and heavier, subject to group differentials.

Cold-finished steel bars and shafting, subject to warehouse differentials for quantity.

All prices f.o.b. warehouse.

PITTSBURGH

	*Base per Lb
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.10c.
Squares and flats	3.60c.
Bands	2.95c.
Hoops	3.60c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.15c. to 3.20c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.50c.
Small	2.75c. to 2.90c.
Boat	3.00c.

Track bolts, all sizes, per 100 count, 70 and 10 per cent off list

Machine bolts, 100 count, 70 and 10 per cent off list

Carriage bolts, 100 count, 70 and 10 per cent off list

Nuts, all styles, 100 count, 73 and 10 per cent off list

Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.25
Cement coated nails, per keg	2.25

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

PHILADELPHIA

	Base per Lb.
Plates, ¼-in. and heavier	2.45c.
Structural shapes	2.45c.
Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform	2.30c.
Cold-fin. steel, rounds and hex.	3.30c.
Cold-fin. steel, sq. and flats	3.80c.
Steel hoops	3.00c.
Steel bands, No. 12 to $\frac{7}{8}$-in., inclu.	2.75c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled and annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼ in.	5.00c.
Swedish iron bars	6.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

BOSTON

	Base per Lb.
Plates	*3.35c.
Structural shapes	*3.35c.
Soft steel bars, small shapes	*3.25c.
Reinforcing bars	3.10c. to 3.25c.
Iron bars—	
Refined	3.25c.
Best refined	4.60c.
Spring steel, open-hearth	5.00c.
Tire steel	4.50c. to 4.75c.
Bands	*3.75c. to 4.25c.
Hoop steel	4.90c. to 5.40c.
Cold-rolled steel—	
Rounds and hex.	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts	40 and 10
Cold-punched nuts	40 and 10
Stove bolts	70 and 10

*Base price (250 to 999 lb.); less than 250 lb., add 50c. per 100 lb.; 1000 to 7999 lb., deduct 15c.; 8000 to 14,999 lb., deduct 25c.; 15,000 lb. and larger lots, deduct 35c.

Copper at New Low Price; Lead and Zinc Also Decline; Tin Steady

NEW YORK, March 1.—A record low price for electrolytic copper was established yesterday, when custom smelters quoted 5.75c. a lb., delivered Connecticut Valley, for prompt delivery. The new low quotation, however, has failed to interest consumers, who are generally covered for their nearby requirements.

Copper Exporters, Inc., named a special price today of 5.87½c. a lb., c.i.f. usual European ports, which resulted in sales of 900 tons. Export sales in February totaled about 26,000 tons, compared with 18,000 tons in January. Lake copper is quotable at 6.12½c. a lb., delivered.

The effect on the copper industry of an unfavorable outcome of the present discussion among foreign and domestic producers regarding production curtailment is viewed with considerable concern. Although the results of the meeting are still a matter of conjecture, the conflicting suggestions presented by various factions regarding curtailment in production and revision of regulations governing export copper sales through Copper Exporters, Inc., are said to be retarding a satisfactory agreement. Results of the conference will probably be made public in the coming week.

Lead

Following price reductions last Friday, the leading producers lowered their quotations further today to 3.25c., New York, and 3.05c., St. Louis. Consumers responded quickly to the lower prices with a substantial amount of buying for March and April delivery. Total bookings in February proved to be disappointing, and the current price reduction was considered by producers as the only expedient to arouse consumer interest from the apathetic state that prevailed during February.

Tin

Current buying is limited to negligible quantities for spot delivery. Owing to the premium of ½c. a month for future sterling, sellers find it practically impossible to move tin for forward delivery. Prices continue to be steady, with today's quotation 21.90c. a lb. Today's London market is £137 15s. a ton for spot standard, £140 for future standard and £140 17s. 6d. for spot Straits. The Singapore market today is £143 15s. The world's visible supply of tin increased 1010 tons in February, while the carryover in the East showed a decrease of 1703 tons. February deliveries of tin were 2825 tons, the lowest for any month since October, 1921. United Kingdom warehouse stocks increased 216 tons last week to 33,457 tons. Production of tin for March is estimated at 5200 tons, while shipments are estimated at 5000 tons.

Zinc

A leading producer is offering zinc at a new low price of 2.75c., East St. Louis, or 3.12c., New York. Little buying has resulted, however, with consumers generally inclined to withhold covering until prices show a firmed tendency.

The Week's Prices. Cost Per Pound for Early Delivery

	Feb. 24	Feb. 25	Feb. 26	Feb. 27	Feb. 29	March 1
Lake copper, New York	6.50	6.50	6.50	6.50	6.50	6.12½
Electrolytic copper, N. Y.*	6.00	5.75	5.75	5.75	5.50	5.50
Straits tin, spot, N. Y.	22.15	22.10	22.00	....	22.05	21.90
Zinc, East St. Louis	2.85	2.82½	2.80	2.80	2.80	2.75
Zinc, New York	3.22	3.19½	3.17	3.17	3.17	3.12
Lead, St. Louis	3.55	3.55	3.30	3.30	3.30	3.05
Lead, New York	3.75	3.75	3.50	3.50	3.50	3.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.37½c. a lb., New York.
Brass ingots, 85-5-5-5, 6.12½c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	24.00c. to 25.00c.
Tin, bar	26.00c. to 28.00c.
Copper, Lake	8.00c. to 9.00c.
Copper, electrolytic	7.75c. to 8.75c.
Copper, casting	7.50c. to 8.50c.
*Copper sheets, hot-rolled	15.37½c.
*High brass sheets	12.50c.
*Seamless brass tubes	15.75c.
*Seamless copper tubes	14.87½c.
*Brass rods	10.25c.
*Brazed brass tubes	21.62½c.
Zinc, slab	4.25c. to 4.75c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.25c. to 4.75c.
Lead, bar	6.00c. to 7.00c.
Lead sheets	8.00c.
Antimony, Asiatic	9.00c. to 10.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	17.00c. to 18.00c.
Solder, ½ and ½	15.00c. to 16.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	26.25c.
Tin, bar	28.25c.
Copper, Lake	7.87½c.
Copper, electrolytic	7.87½c.
Copper, casting	7.50c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	4.30c. to 4.50c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	29.75c.
Solder, ½ and ½	17.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	4.50c.	5.25c.
Copper, hvy. and wire	4.25c.	5.00c.
Copper, light and bottoms	3.50c.	4.12½c.
Brass, heavy	2.25c.	2.75c.
Brass, light	1.75c.	2.50c.
Hvy. machine composition	3.50c.	4.00c.
No. 1 yel. brass turnings	2.50c.	3.00c.
No. 1 red brass or compos. turnings	3.00c.	3.50c.
Lead, heavy	2.50c.	3.00c.
Zinc	1.00c.	1.50c.
Cast aluminum	3.25c.	5.00c.
Sheet aluminum	8.50c.	10.50c.

Reinforcing Steel

Awards 2325 Tons—New Projects 1700 Tons

New York, 180 tons, Columbia University library, to Empire Steel Products Co.; Marc Eidlitz & Son, Inc., general contractor.

Elmira, N. Y., 250 tons, additions and alterations to State reformatory, to Concrete Steel Co.

Washington, 850 tons, including bars, piles and pile caps for Archives Building, to Capital Fireproof Products Corpn., Rosslyn, Va.

Washington, 263 tons, barracks at Bolling Field, to Rosslyn Steel & Cement Co., Washington.

Long Beach, Cal., 200 tons, post office, to Soule Steel Co.

Cloverdale, Cal., 210 tons, State highway structures, to Truscon Steel Co.

Los Angeles, 150 tons, physics building, University of California, to Pacific Coast Steel Co.

Los Angeles, 100 tons, first unit of Chrysler plant, to Truscon Steel Co.

Pasadena, Cal., 116 tons, city warehouse, to Truscon Steel Co.

NEW REINFORCING BAR PROJECTS

Newark, N. J., 500 tons, post office.

Kalamazoo, Mich., 400 tons, reservoir; project postponed.

Milwaukee, 125 tons, Government work; to be rebid.

Marseilles, Ill., 100 tons, dam on Illinois River.

Chicago, tonnage being estimated, World's Fair buildings.

Cook County, Ill., 200 tons, road work.

St. Paul, Minn., 240 tons, post office; bids to be opened March 3.

Salt Lake City, 100 tons, Saltair highway bridge; general contract to Christensen & Gardner.

Gladstone, Ore., 179 tons, Clackamas River highway bridge; bids to be opened March 16.

San Francisco, 100 tons, Sacred Heart college.

Sacramento, 570 or 336 tons, post office (bids opened March 2 with alternate specifications).

PLANT EXPANSION AND EQUIPMENT BUYING

No Improvement in Machine Tool Trade

Orders at a Minimum in All Districts—Outlook Is Still Uncertain

MACHINE tool business has had no significant improvement. Here and there are dealers whose volume of sales in February showed a moderate gain over those of January, but there are a larger number whose business has been at a dead level so far this year.

The future is still uncertain. It is obvious that no marked change will occur in machine tool buying until there has been a noticeable betterment in general industrial conditions. Many of the largest machine tool users in the country are operating their plants on greatly restricted schedules and idle machines are numerous.

While inquiries are in fair volume, considering the conditions as a whole, few of them are regarded as more than "feelers." Prospective buyers are gathering the information that they will need before making purchases, but in most instances the orders will be delayed, perhaps indefinitely.

New York

Machine tool dealers and direct factory representatives in this district see no change in market conditions beyond a fair increase in inquiries. While some dealers had a larger volume in February than in January, the improvement was of no particular significance, as no general upward trend was indicated. Considering that many of the largest machine tool users in this district are operating their plants on greatly reduced schedules, with many machines idle, the machine tool trade does not look for any important betterment in machine tool orders until such plants have increased their operations a great deal.

Cleveland

The volume of machine tool business in February was practically the same as in January. Business is confined to single orders for small machines and is coming mostly from makers of automotive parts. While sentiment is somewhat better, the trade does not see much prospect of an early improvement in demand.

Milwaukee

Improvement in sentiment and a growing belief that a more favorable trend may now be looked for are the only recent developments in the machine tool trade. The volume of new business has not assumed significant proportions, but most plants are holding their own as to production schedules, which are not so spotty as recently. Inquiry continues moderately active and includes some prospective buyers who have been out of the market a long time.

Chicago

Dealers still find local trade dull, though recently users of old machine tools, who operate in territory surrounding Chicago, are showing more interest. Railroad purchases are confined to a few small tools. No improvement is noted in job shop operations or inquiries.

Pittsburgh

Orders for machinery and equipment are still slow, and business in the aggregate has shown no improvement over January. New inquiry is still appearing in fair volume, but much of it is tentative. A number of companies have machinery buying programs in contemplation, but appropriations are not always forthcoming.

Heavy machinery and equipment builders in this district have little backlog business on their books and most of them are running at reduced rates. Sizable improvement programs by steel companies are lacking, but one large company in the district is said to be making plans for extensive activity along this line.

Cincinnati

The volume of machine tool inquiry has receded the past week. General sentiment, however, is that some improvement is imminent. New business is small and spotty. A leading lathe manufacturer reopened his plant last week, but is planning to close this week.

◀ NEW YORK ▶

Samuel J. Kessler, 125 West Forty-fifth Street, New York, architect and engineer, has filed plans for two-story automobile service, repair and garage building, 100 x 150 ft., on West 204th Street. Cost about $100,000 with equipment.

Klumpp Mfg. Co., New York, manufacturer of machinery parts and equipment, leased space in building at 305 East Forty-sixth Street for local works.

Signal Supply Officer, Army Base, Brooklyn, asks bids until March 7 for 54,000 ft. cable (Circular 97); until March 14 for quantity of cable reels (Circular 96).

Amalgamated Cornice & Roofing Co., New York, has been organized by Joseph A. and Nathan A. Gluckman, to take over and expand company of same name at 230 East Twenty-second Street, manufacturer of metal roofing, cornices and other building products.

Berst-Forster-Dixfield Co., Grand Central Terminal, New York, manufacturer of wood and other novelties, pulp products, etc., has acquired plant of Saranac Pulp & Paper Co., Plattsburg, N. Y., now in bankruptcy, for new plant unit, operating in conjunction with present Plattsburg plant in immediate vicinity. It is planned to double present capacity of Saranac plant.

Hones Steel Corpn., New York, has been organized by John G. Charles, 80 South Elliott Place, Brooklyn, and George E. Dix, 96 Jefferson Avenue, Maplewood, N. J., to manufacture steel and other metal products.

Bureau of Supplies and Accounts, Navy Department, Washington, and Naval Supply Depot, Brooklyn, asks bids until March 8 for 9700 steel boiler tubes (Schedule 7548); until March 15 for 30 automatic air compressors with tank (Schedule 7592).

Queensboro Dairy Co., 35-12 Forty-second Street, Long Island City, will build new plant, 75 x 200 ft., at Astoria, L. I. Cost about $200,000 with tanks, conveying machinery and other equipment. William I. Hohauser, 17 West Forty-fourth Street, New York, architect and engineer.

Phelps Dodge Corpn., 40 Wall Street, New York, has organized Phelps Dodge Copper Products Corpn., a subsidiary to take over copper fabricating branch of business, heretofore under direction of National Electric Products Corpn., another subsidiary. Last

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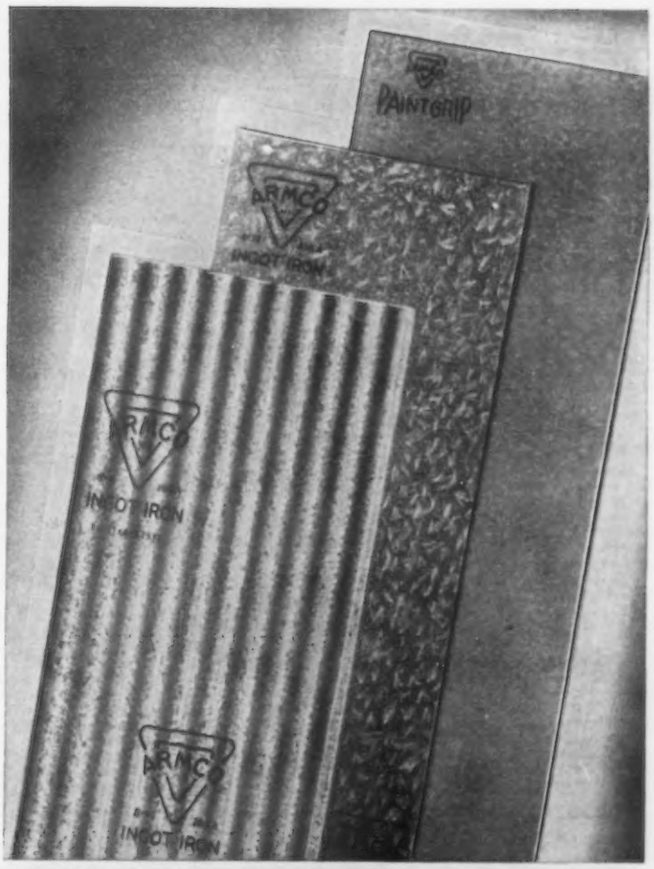

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»» *PIONEERS IN CONTINUOUS SHEET ROLLING* ««

noted organization will continue plant at Ambridge, Pa., concentrating largely in production of metal molding and kindred specialties. New division will develop fabricating works of company; it will be headed by Wylie Brown. H. C. Robinson is president of National Electric division.

New York Telephone Co., 140 West Street, New York, authorized fund of $333,920 for immediate new construction in different parts of State, including buildings, station equipment, underground and overhead line extensions, etc.

Flintkote Co., 100 East Forty-second Street, New York, manufacturer of roofing products, etc., let general contract to Ferber Construction Co., 16 Johnson Avenue, Hackensack, N. J., for two-story addition, 36 x 55 ft., to plant at East Rutherford, N. J. Cost close to $40,000 with equipment. Karl A. Lefren, Inc., 171 Madison Avenue, New York, is architect and engineer.

Merck & Co., Inc., Rahway, N. J., manufacturer of industrial chemicals, etc., soon takes bids for one and two-story addition. Cost over $100,000 with equipment. C. B. Lewellyn is company engineer.

Poellot Sheet Metal Works, Inc., Guttenberg, N. J., has been organized by Paul Conrad and Martin Poellot, care of Vanderbach & Vanderbach, 43 Bline Avenue, to manufacture sheet metal products.

Borough Council, Borough Hall, Chatham, N. J., asks bids until March 7 for deep-well pumping machinery and accessories. Clyde Potts, 30 Church Street, New York, consulting engineer.

Common Councils of Rahway, Westfield, N. J., and neighboring municipalities, plan installation of pumping plant near Rahway city line in connection with disposal plant for Rahway Valley trunk sewer. Pumping unit will cost $60,000. Kenneth Simmen, president, Common Council, Rahway. Alexander Potter, 50 Church Street, New York, is consulting engineer.

Capstaff Marine Turbine Co., Inc., recently incorporated, has leased building and pier, with option to buy, at Eleventh and Hudson Streets, Hoboken, N. J. J. Capstaff is vice-president and treasurer, and A. H. Wroe is secretary. Company is engaged in ship repairs and turbine work.

PHILADELPHIA

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, has work under way on new central coal breaker near St. Nicholas, Pa., with auxiliary cleaner plant. It will replace from five to seven smaller breaker plants in district noted. Program includes mine electrification and installation of new mining equipment. Cost over $1,500,000 with machinery.

Philadelphia Range, Boiler & Tank Co., Philadelphia, has been organized to take over and expand Philadelphia Range, Boiler & Steel Tank Co., 2656 Salmon Street, manufacturer of boilers, tanks, etc. Ira L. Couch, Walter and M. K. Price, all of Elkins Park, Pa., head new organization.

Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has acquired property at Jefferson and Radnor Streets, Media, Pa., 109 x 150 ft., for future expansion in power facilities.

Bureau of Supplies and Accounts, Navy Department, Washington, and Navy Yard, Philadelphia, asks bids until March 15 for one motor-driven automatic screw machine (Schedule 7591); for 25,000 ignition wire terminals (Schedule 7497) for Philadelphia Navy Yard.

Vacuum Oil Co., 61 Broadway, New York, plans rebuilding circulating tower used for preheating oil at refinery at Billingsport, near Paulsboro, N. J., recently destroyed by explosion.

Fitz-Gibbon & Crisp, Inc., Calhoun and Dunham Streets, Trenton, N. J., manufacturer of automobile bodies, is running on a capacity schedule, with day and night working forces. Company has order for 400 dump truck bodies for refuse service for city of New York. Work is under way on one-story addition, 70 x 130 ft.

Willard Screw & Machine Works, Inc., has been organized by Peter A. Eifinger, 1812 East Tartel Street, and Frederick Rhodes, 3321 H Street, to manufacture bolts, nuts, screws, hardware specialties, etc.

Scranton School District, Scranton, Pa., plans manual training department in three-story and basement junior high school; bids to be asked soon on general contract. Cost about $1,200,000 with equipment. T. Williams, Scranton Life Building, architect and engineer.

Edge Moor Iron Co., Edge Moor, Del., has secured contract for steam generating and mechanical equipment for new central steam power plant for Duluth Steam Corpn., Duluth, Minn., including four large watertube boilers, each with rating of 850 hp., totaling close to $500,000. Plant operations will be increased and number of former employees reinstated.

Philadelphia Storage Battery Co., Ontario and C Streets, Philadelphia, will erect new television broadcasting station for experimental purposes. P. T. Farnsworth is radio engineer.

CINCINNATI

State Highway Department, Hartman Building, Columbus, Ohio, O. W. Merrell, director, has plans for three-story and basement experimental and testing plant for State highway testing station. Cost about $85,000 with equipment. Howard Dwight Smith, Brown Hall, Ohio State University, architect.

Contracting Officer, Wright Field, Dayton, Ohio, asks bids until March 15 for one airship maneuvering equipment (Circular 299); until March 18 for one improved type airship hull assembly (Circular 300).

Ohio Oil Co., Findlay, Ohio, contemplates purchase of about 100 acres of land on Maumee Bay, near Toledo, Ohio, for new oil plant with storage and distributing facilities.

Sunbright Gas Co., Lenoir City, Tenn., plans installation of natural gas system and distributing plant for local service.

American Barge Line, Memphis, Tenn., has acquired three and one-half acres near terminal property on Wolf River for expansion. Plans include new storage and distributing units, with conveying, loading and other equipment. Cost about $50,000. Project will be carried out by Wolf River Terminal & Warehouse Co., a subsidiary.

Leland Electric Co., Dayton, Ohio, manufacturer of fractional horsepower motors, is running on production schedule of 550 motor units daily, with employment of about 350 persons in all departments. Present basis compares with peak output of 620 motors a day in 1929.

Air Conditioning Engineering Co., Dayton, Ohio, care of P. H. Blum, 316 Harries Building, has been organized by Harry C. Kelly, Dayton, and associates, to manufacture air-conditioning machinery and parts.

City Council, Ludlow, Ky., has plans for waterworks extensions and improvements, including two deep-well pumping units with auxiliaries, two high-pressure pumps, 1,500,000-gal. reservoir, water-softening equipment, etc. Cost over $400,000. Glazier & Morlidge, Broeman Building, Cincinnati, engineers; Fosdick & Hilmer, Union Trust Building, Cincinnati, consulting mechanical engineers.

Quartermaster, Fort Knox, Ky., asks bids until March 10 for quantity of wire, sockets, switches, conduit, bushings, fuses, etc. (Circular 31); until March 7 for 16 hot-water storage tanks, 10 water heaters, cast iron pipe, fittings, 20,000 ft. wrought iron pipe, etc. (Circular 32); until March 21 for 30,000 sq. ft. galvanized screen wire cloth, 36,500 lb. nails, wire tacks, brads, etc. (Circular 29).

CHICAGO

White Cap Co., 1369 North Branch Street, Chicago, manufacturer of metal caps for glass containers, vapor sealing machines, etc., has arranged with Phipps Industrial Land Trust, 39 South LaSalle Street, for erection of two-story plant, 120 x 160 ft., in Keeney Industrial District, to be purchased under contract. Structure designed and will be erected by Austin Co., and is scheduled for completion in May. White company will double capacity at new location. Cost about $125,000 with equipment.

Swift & Co., Union Stock Yards, Chicago, plans extensions and improvements in packing plant at Omaha, Neb. Cost over $175,000 with equipment.

Board of Education, City Hall, Minneapolis, asks bids until March 7 for equipment for new Sheridan school, including mechanical stokers, boiler feed and vacuum pumps, centrifugal fans and blast heaters, electric motors and controllers, electrical cabinets and panels, air filters, etc. Bureau of Buildings, Architectural Division, 811 Broadway Street, N. E., is architect.

Pullman Car & Mfg. Corpn., Chicago, is increasing operations at repair and reconditioning shops, recalling 400 workers.

Chicago Union Station Co., Union Station, Chicago, has filed plans for seven-story power plant. Cost $295,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, architects.

Peoples Natural Gas Co., City National Bank Building, Omaha, Neb., plans distributing system at St. Peter, Minn., and vicinity, connecting with main pipe line to be constructed through Faribault, Minn.

United States Engineer Office, First District, Chicago, asks bids (no closing date stated) for electrical equipment for locks at Dresden Island and Brandon Road.

Simpson, Inc., Chicago, recently organized to manufacture corrugated and other paper boxes, fiber cans, etc., has leased one-story factory at 6551 West Sixty-fifth Street, 20,000 sq. ft. floor space, for new plant. Company also secured lease of adjoining property on South Nashville Avenue for expansion. C. T. Simpson is president.

Bureau of Reclamation, Denver, asks bids until March 30 for pumping plant at Wippel, Kittitas Division, Yakima project, Wash. (Specification 531); until April 4 for two 45-in. diameter plate steel penstocks, each about 469 ft. long, and for one 42-in. diameter plate steel discharge pipe with manifold connections, about 2100 ft. long, for Wippel pumping plant, Yakima project, Wash. (Specification 532).

Common Council, Sumner, Iowa, has plans for municipal electric light and power plant. Cost over $65,000 with equipment. H. L. Cory, 3905 North Seventeenth Street, Omaha, Neb., is consulting engineer.

BUFFALO

Irving Air Chute Co., 374 Pearl Street, Buffalo, manufacturer of air chutes, aircraft equipment, etc., has filed plans for new plant at 1668-74 Jefferson Street. Cost about $50,000 with equipment.

New York Utilities, Inc., Watertown, N. Y., will make extensions in power lines and operating equipment at Pamelia, N. Y., and vicinity.

Brown-Lipe-Chapin Co., Ontario and Marcellus Streets, Syracuse, N. Y., manufacturer of automobile gears, division of General Motors Corpn., is running on production schedule of between 50 and 60 per cent of maximum.

Spring Perch Co., Inc., Lackawanna, N. Y., has been organized under State laws by officials of company of same name at Stratford, Conn., manufacturer of automobile leaf springs and kindred equipment. Work is under way on new plant on Hamburg Turnpike, consisting of two one-story units, 160 x 250 ft. and 60 x 200 ft. Cost about $125,000 with equipment. Stratford works will be removed to new location. J. C. Hawley, 106 Unquowa Hill, Bridgeport, Conn., and A. H. Knapp, 290 Elliott Street, Stratford, head new company.

ST. LOUIS

Consolidated Milling Co., Winfield, Kan., let contract to McDowell Construction Co., Denver, for addition to grain mill. Cost about $100,000, with elevating, screening, conveying and other equipment.

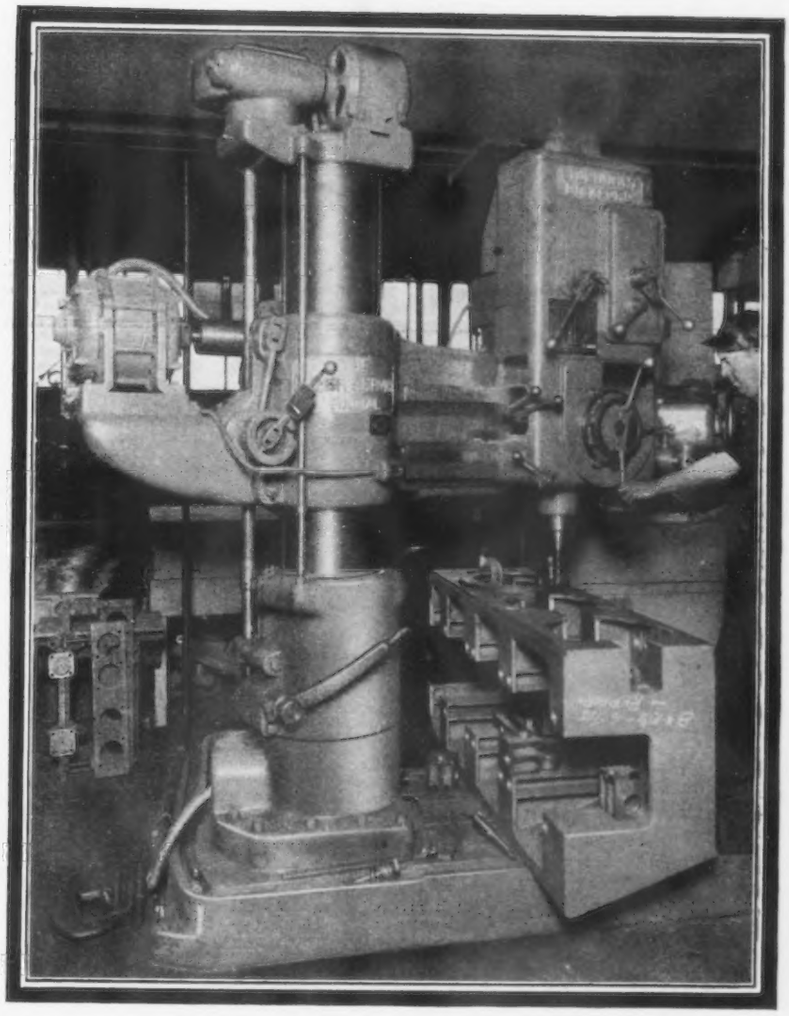
Universal Mfg. & Sales Corpn., St. Joseph, Mo., has been organized by H. H. Hutchinson and August Fenner, St. Joseph, to manufacture spraying machines and parts.

Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, has closed bids on general contract for new four-story and basement baking plant, 85 x 120 ft., with one and one-half story service, garage and mechanical shop, 43 x 64 ft., St. Louis. Cost about $750,000 with traveling ovens, conveyors, mixing and other machinery. Emil E. Niemann, 3816 Shaw Avenue, St. Louis, architect. C. R. Wagner, chief engineer for company.

Anderson-Prichard Oil Corpn., Oklahoma City, plans rebuilding oil refinery at Cyril, Okla., recently destroyed by fire. Loss over $80,000 with equipment.

Metropolitan Utilities District, Harney and Eighteenth Streets, Omaha, Neb., has plans for new water-gas generating plant, with daily capacity of 15,000,000 cu. ft., output to be doubled later. Cost over $900,000 with equipment. C. D. Robinson is chief engineer.

Missouri-Pacific Railroad Co., Thirteenth and Olive Streets, St. Louis, plans rebuilding central unit of grain elevator at Kansas City, Mo., recently destroyed by fire. Loss over



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$100,000 with equipment. E. A. Hadley is chief engineer.

Pennzoil Co., Davidson Building, Kansas City, Mo., oil products, leased two buildings, 50 x 50 ft. and 25 x 63 ft., respectively, to be erected at Twenty-eighth Street and Southwest Boulevard, for new bulk oil storage and distributing plant. Cost about $30,000 with equipment. C. A. Smith, Finance Building, architect.

Mosland Metal Weatherstrip Co., St. Louis, has been organized by W. J. Mosland, 4924 Buckingham Court, and associates, to manufacture metal weatherstrips and kindred products.

City Council, Washington, Mo., is considering municipal electric light and power plant. Cost over $85,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., engineer.

E. A. Kremer, 4500 Calvert Street, Lincoln, Neb., is at head of project to erect a canning plant in southeastern part of city. Cost about $40,000 with machinery. Company will be organized to carry out work.

◀ CLEVELAND ▶

Defiance Spark Plugs, Inc., 323 Twentieth Street, Toledo, Ohio, has purchased property in suburban district and contemplates new plant. Cost over $75,000 with equipment.

Commanding Officer, Ordnance Department, Erie Ordnance Depot, LaCarne, Ohio, asks bids until March 7 for a steel water tank, 100,000 gal. capacity, supported on steel tower, at local station (Circular 26).

Gulf Refining Co., Frick Annex, Pittsburgh, approved plans for further expansion at former Paragon oil refinery, Toledo, Ohio, acquired last year, including installation of coke stills and accessories, increasing plant battery to 14 units, new tanks and other equipment. Cost over $150,000.

Plain Natural Gas-Heating Co., Canton, Ohio, organized by Russell E., Oscar M., and J. Stewart Ake, Renkert Building, capital $100,000, to equip and operate plant, pipe lines and system for natural gas service.

Cleveland Watering Place Co., East Fortieth Street, Cleveland, has plans for one-story bottling plant, 30 x 150 ft. James A. Tuck, Hickox Building, architect.

American Supply Co., Marietta, Ohio, oil well equipment and supplies, plans rebuilding portion of storage and distributing plant recently destroyed by fire. Loss over $100,000 with equipment.

Wheeling & Lake Erie Railroad Co. has resumed operations at shops at Massillon, Ohio, following shut-down since December. About 200 men will be employed.

◀ INDIANA ▶

Board of Sanitary Commissioners, Indianapolis, O. C. Ross, president, asks bids until March 8 for one centrifugal pumping unit.

White Star Oil Co., Indianapolis, has been formed to take over company of same name, operating storage and distributing plants in different parts of State, and Supreme Oil & Refining Co., 518 North Delaware Street. Consolidated organization will have group of 37 bulk oil plants in about 27 counties and will carry out expansion. Working agreement has been made with Lubrite Refining Corpn., 3504 Washington Street, St. Louis, subsidiary of Vacuum Oil Co., New York, to provide storage and distributing facilities for Vacuum oils and products in Indiana. H. H. Johnson is president and C. E. Werner, treasurer, White Star company.

Huntington Asbestos Co., Huntington, manufacturer of brake linings, clutch facings, etc., is increasing capacity and will reinstate about 80 operatives, following curtailment of several weeks.

Board of Trustees, Purdue University, West Lafayette, asks bids on general contract until March 20 for multi-story mechanical engineering building, 60 x 230 ft. Cost about $200,000 with equipment. Walter Scholer, Wallace Building, Lafayette, architect.

Mohawk Appliances, Inc., Indianapolis, has been organized by Alvin C. Ostermeyer, 3740 North Penn Street, and associates, to manufacture mechanical and electrical devices and appliances.

◀ DETROIT ▶

Board of Education, Wyandotte, Mich., plans manual training department in new Garfield school. Cost about $200,000. B. C. Wetzel & Co., Dime Bank Building, Detroit, architects.

United States Engineer Office, Detroit, asks bids until March 8 for three water current meters and accessories (Circular 22).

Ford Motor Co., Dearborn, Mich., let general contract to Butts Construction Co., 6500 Epworth Boulevard, Detroit, for two new power substations at River Rouge plant, one for steel mill operation and other for glass plant. Cost over $90,000 with equipment.

Welding Machines Mfg. Co., Detroit, has been organized to take over and expand company of same name at 17325 Lamont Avenue, manufacturer of welding machinery and parts. Harry V. Beronius and Albert D. Jardine are heads.

Long Mfg. Co., 2768 East Grand Boulevard, Detroit, has begun production of new line of copper radiators for industrial, domestic and other heating service. Company heretofore has concentrated manufacture for automobile radiators and clutches. It is a subsidiary of Borg-Warner Corpn., Chicago.

Sparks Withington Co., Jackson, Mich., manufacturer of radio equipment, automobile appliances, etc., has arranged with Visionola Mfg. Corpn., 60 East Forty-second Street, New York, for manufacture and distribution of its products, including a talking and silent motion picture projector, electric radio equipment and phonograph talking apparatus in single cabinet. Production will be carried out at Jackson plant.

Isabella Sugar Co., Mount Pleasant, Mich., recently organized by John Carroll and Charles Coryell, Bay City, Mich., capital $300,000, is concluding arrangements for acquisition of Mount Pleasant mill of Columbia Sugar Co., defunct. Improvement and reconditioning program will be carried out, including equipment replacements. H. A. Vallez will be general manager.

Schreiber Brothers, Inc., Detroit, has been organized by Murray W. Schreiber, 4806 Sturtevant Avenue, and associates, to manufacture sheet metal products, roofing specialties, etc.

Harry Brothers Mfg. Co., Woodbridge and Rivard Streets, Detroit, manufacturer of stampings, pressed metal and machined specialties, has changed its corporate name to Harry Brothers Stamping Co. E. E. Vender, formerly with Ernst & Ernst, accountants, has been appointed general manager.

◀ SOUTH ATLANTIC ▶

James Cumbest, Baltimore, has leased one-story building at 2314 Madison Avenue, for new machine and repair works.

United States Engineer Office, Washington, asks bids until March 8 for quantity of cast iron fittings for sand-handling system (Circular 115).

Sun Oil Co., 1608 Walnut Street, Philadelphia, plans early call for bids for bulk oil storage and distributing plant at Baltimore, including service and garage unit for motor trucks, etc.

Giant Furniture Mfg. Co., High Point, N. C., plans rebuilding machine and cabinet departments recently destroyed by fire. Loss over $150,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 7 for two sets hoisting and counterweight for Thatcher highway ferry, Canal Zone (Schedule 2733); until March 11 for locomotive tender wheels, automatic scale, paint cans, etc. (Schedule 2731).

Potomac Electric Power Co., Tenth and E Streets, N. W., Washington, let general contract to R. P. Whitty Co., 1010 Vermont Avenue, for addition to power substation at Thirteenth and D Streets, N.E. Cost over $50,000 with equipment.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until March 7 for experimental chassis parts, including engines, radiators, frames, axles, transmission gearing, steering gears, springs, fenders, etc. (Circular 91.)

United States Cold Storage Co., 2101 West Pershing Road, Chicago, will begin construction soon on nine-story cold storage and refrigerating plant, at Atlanta, Ga. Cost over $500,000 with machinery. Sproul Construction Co., 2001 West Pershing Road, Chicago, general contractor.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 8 for two hydraulic hardness testing machines (Schedule 7515, and for one fuel research engine (Schedule 7562) for Annapolis Navy Yard; for 13,500 lb. sheet rolled naval brass (Schedule 7558) for Norfolk Navy Yard; about 640,000 lb. plate steel (Schedule 7537) for Norfolk and Philadelphia yards; until March 15 for quantity of nails, tacks and spikes (Schedule 7530), grommets, brass and rings (Schedule 7546) for Eastern and Western yards; coil and jack chain (Schedule 7552) for Eastern and Mare Island Navy Yards; until March 22 for four steering power transfer switchboards and spares (Schedule 7555) for Eastern and Western yards.

Board of Aldermen, Fayetteville, N. C., O. C. McFadyen, chairman, Finance Committee, plans lease of about 80 acres to local interests for construction and operation of airport, including hangars, repair shop and other field units. It is proposed to organize company to carry out project.

Hygeia Ice & Fuel Co., Kennedy Street, Spartanburg, C. S., plans one-story addition for new refrigerating plant. Equipment will be electric-operated.

◀ GULF STATES ▶

Robbins Tire & Rubber Co., Muscle Shoals City, Ala., recently organized by E. S. Robbins and associates, has acquired plant of Rubber Products Corpn. for production of automobile tires and tubes. Extensions and improvements will be made.

Mechanical Equipment Corpn., New Orleans, has been organized by John E. Pottharst, 3330 Versaille Bend, and associates, to manufacture mechanical products.

Burford Oil Co., Tulsa, Okla., contemplates extensions and improvements in oil refining plant at Pecos, Tex., including additional equipment. Cost over $100,000.

Quartermaster, Fort Crockett, Tex., asks bids until March 7 for one windmill, pump, water storage tank, pipe, etc. (Circular 37).

Jacksonville Gas Co., Jacksonville, Fla., is considering extensions and improvements in pipe lines and distributing system. Cost about $45,000 with equipment.

Pan-American Petroleum & Transport Co., New Orleans, has plans for one story bulk oil storage and distributing plant, 80 x 185 ft., at Destrehan, La. Bids asked on general contract. J. D. Tufts is company engineer.

Guiberson Diesel Engine Co., Dallas, Tex., has been organized by officials of Guiberson Corpn., Dallas, manufacturer of oil well machinery and equipment, to develop new branch of business for production of Diesel motors for aircraft service, including parts production and assembling. Company will have works at plant of parent organization. N. G. Guiberson is head.

Bureau of Supplies and Accounts, Navy Department, Washington, and Navy Yard, Pensacola, Fla., asks bids until March 15 for one motor-driven cutter and tool grinder (Schedule 7579) for Pensacola yard.

Earth Products Co., Houston, Tex., care of E. G. Noxon, 190 Glendale Street, recently organized by Mr. Noxon and associates, capital $300,000, has secured at Harrisburg, near Houston, one-story plant, 75 x 300 ft., for production of special earth and mineral products, including metallic minerals. Initial unit will cost over $100,000 with processing, mechanical-handling and other machinery.

Vernon Parish School Board, Leesville, La., plans manual training equipment in new high school to replace unit recently destroyed by fire. Cost over $100,000. Jones, Roessle, Olschner & Wiener, Ardis Building, Shreveport, La., architects; L. H. Roeger, last noted address, is engineer.

Stanolind Oil & Gas Co., Tulsa, Okla., contemplates erection of gasoline refining plant near properties in Rusk County, Tex. Company is also planning oil storage and distributing terminal on Houston ship channel, Houston, Tex. Cost over $100,000 with equipment.

Texas Potash Co., Dallas, Tex., plans sinking of shaft, about 2000 ft. deep, at potash properties at Odessa, Tex., within next 60 days, and will arrange facilities for large output. Initial development to cost about $200,000.

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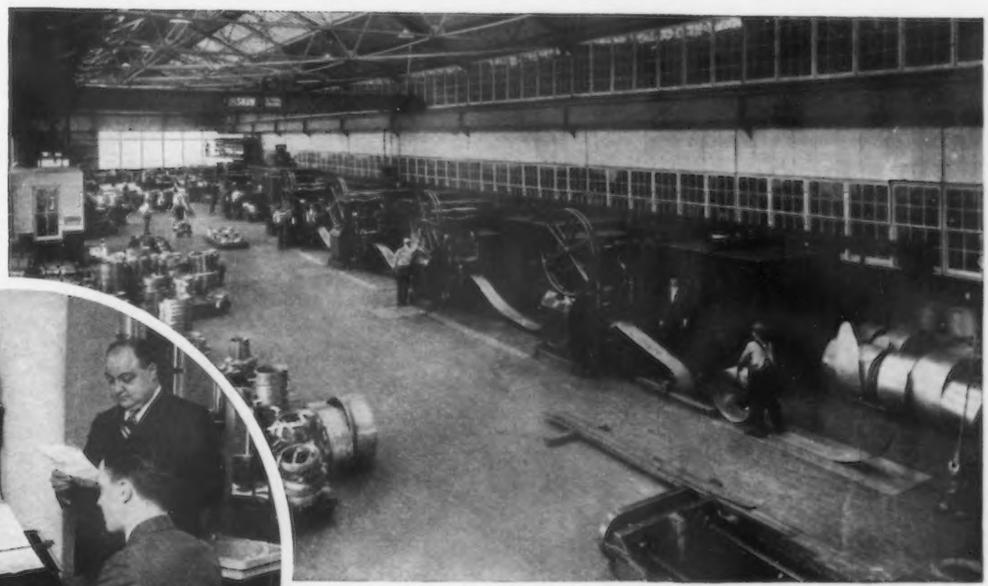

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NEW ENGLAND

City Council, Cambridge, Mass., let general contract to George A. Fuller Co., 11 Beacon Street, Boston, for multi-story addition to Rindge Technical High School. Appropriation of $1,600,000 was recently approved for building and equipment. Ralph Harrington Doane, 60 Batterymarch Street, Boston, architect.

Crawford Machine Works, South Weymouth, Mass., plans rebuilding of part of plant recently damaged by fire. Loss about $40,000 with equipment.

Essex Packing Co., Beacon Street, Lawrence, Mass., food products, asked bids on general contract for two-story and basement addition. Cost about $35,000 with equipment.

Rhode Island Ice Co., Phillipsdale, R. I., has plans for new artificial ice-manufacturing plant at Omega Pond. Cost about $75,000 with machinery.

Colonial Beacon Oil Co., 30 Beacham Street, Everett, Mass., has asked bids on general contract for new oil storage and distributing plant at Springfield, Mass. Cost close to $40,000 with equipment.

Fiberloid Corpn., Indian Orchard, Mass., manufacturer of fiber products, let general contract to Adams & Ruxton Construction Co., 1387 Main Street, Springfield, Mass., for one-story addition for storage and distribution.

Remington Noiseless Typewriter Corpn., Middletown, Conn., subsidiary of Remington-Rand Business Service, Inc., New York, is increasing production and recalling large number of employees.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 8 for 60,000 lb. aluminum-alloy ingot (Schedule 7545) for Portsmouth, N. H., Navy Yard.

Wonder-Heat Burner Co., Salem, Mass., has been organized by Ralph A. Morrison, 40 Sea View Avenue, Marblehead, Mass., and associates, to manufacturer oil burners and oil-burning equipment.

Coast Guard Headquarters, Washington, let contract to V & M. Construction Co., Yonkers, N. Y., for new Coast Guard School unit at New London, Conn., on bid of $96,928.

PITTSBURGH

Broad Top Coal Operators' Association, Saxton, Pa., is considering construction of new mechanical coal-cleaning, sizing and distributing plant for metallurgical coal. Cost over $500,000 with machinery. C. F. Zimmerman, First National Bank Building, Huntingdon, Pa., president, is in charge.

United States Engineer Office, Huntington, W. Va., asks bids until March 9 for one cutter-ladder, including machinery, and for one cross-deck, five-drum hauling and hoisting equipment (Circular 159); until March 7 for boat repairs, including steel hulls of derrick boats, etc. (Circular 157); (no closing date stated) for ladder and hoisting machinery for dredge boat Portland.

Pittsburgh Coal Co., Oliver Building, Pittsburgh, plans construction of new coal dock on Ohio River, near East Liverpool, Ohio, with conveying, loading and other equipment.

DuBois National Castings Co., DuBois, Pa., has been organized by W. C. Tooke and C. G. Krise, DuBois, to manufacture iron, steel and other metal castings.

Yough-Connellsville Coal & Coke Co., Connellsville, Pa., has leased coal mines of H. C. Frick Coke Co. at Davidson and Trotter, idle for several years. Reconditioning and improvements will be made, including installation of additional mining, hoisting, loading and other equipment. Working force of about 700 men will be employed at both properties.

J. D. Westcott & Son, Union City, Pa., manufacturer of handles, etc., has begun erection of new one-story plant at Williamson, W. Va. Plant at Richwood, W. Va., will be removed to new location and capacity increased. Arthur H. Brown, superintendent at Richwood plant.

Sherwood Refining Co., Warren, Pa., has been organized by officials of Sherwood Petroleum Co., 241 Thirty-seventh Street, Brooklyn, N. Y., including Harold H. Sherwood, to take over oil works of Mutual Refining Co., Warren, recently acquired. New owner will operate for production of processed oils.

United States Stamping Co., Wheeling, W. Va., manufacturer of stamped metal products, is planning increased operations and will add about 50 men to working force. Company has secured three-year contract from Westinghouse Electric & Mfg. Co., East Pittsburgh, for industrial reflectors.

Westinghouse Electric & Mfg. Co., range division, Mansfield, Ohio, has received an order for 2000 electric ranges from Alabama Power Co., Georgia Power Co. and Tennessee Electric Power Co., all properties of Commonwealth Southern group.

MILWAUKEE

Alloy Products Corpn., 1556 South First Street, Milwaukee, manufacturer of stainless steel containers, has transferred plant and production to Waukesha, Wis., effective March 1, and is now occupying former machine shop and foundry of Waukesha division, Creamery Package Mfg. Co., Chicago. Capitalization has been increased from $50,000 to $150,000 and Waukesha interests have become identified with industry.

Thilmany Pulp & Paper Co., Kaukauna, Wis., has placed general contract with Permanent Construction Co., 725 North Water Street, Milwaukee, for one-story paper mill unit, 135 x 200 ft., to house mill operations now conducted at branch plant in Waukegan, Ill. Additions will be made to equipment of Waukegan plant when transferred to Kaukauna.

Palmyra Mfg. Co., Palmyra, Wis., has been organized by W. R. Norris, J. J. Stasek and W. R. Clark and is equipping shop for manufacture of power-driven hack saw and other mechanical specialties. W. W. Erni, formerly of Fort Atkinson, Wis., has been appointed general manager.

Cedar Grove, Wis., Village Board closes bids March 11 for construction of complete sewage and waterworks plant and system, requiring one 350 g.p.m. deep well turbine, one 350 g.p.m. general service pump and motor, one 500 g.p.m. auxiliary pump with 6-cyl. gasoline engine drive, automatic control system, and one 60,000-gal. elevated steel storage tank, 120 ft. high. Work is directed by A. E. McMahon Engineering Co., Menasha, Wis. L. J. Meylink is secretary of board.

Outboard Motors Corpn., Milwaukee, manufacturer of outboard engines for rowboats, speedcraft, etc., is starting immediate production of ¾-hp. engine unit for propelling bicycles.

Gordon Metals Corpn., 727 East Polk Street, Milwaukee, smelter of non-ferrous metals, reports unfilled orders largest in two years and double a year ago. January was 40 per cent and February 60 per cent ahead of same months of 1931.

PACIFIC COAST

Board of Trustees, Harvard School for Boys, 1601 South Western Avenue, Los Angeles, has plans for new school group at Westwood, near Los Angeles, with vocational shops and other mechanical units. Cost about $1,000,000 with equipment. Webber & Spaulding, and Gates W. Burrows, 627 South Carondelet Street, architects; Reginald D. Johnson, Architects' Building, consulting architect.

Northrop Corpn, Los Angeles, has been organized by officials of Douglas Aircraft Co., Inc., 3000 Ocean Park Boulevard, Santa Monica, Cal., as a subsidiary to manufacture new types of aircraft for military and commercial service. Lease has been taken on plant of Moreland Aircraft Co., Los Angeles, with option to purchase.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has revised plans for one-story equipment storage and distributing plant at Hayward, Cal. Cost about $30,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until April 6 for equipment for naval air station, Sunnyvale, Cal., including traveling bridge crane, gasoline engine-driven electric generator, motor-driven centrifugal fire pumps, portable firebox boilers, gas burners, reciprocating boiler feed pumps, motor-driven vertical shaft hot well and drainage pumps, cooling tower, water-softening equipment, switchboard, all outside piping systems for steam, natural gas and low pressure helium distribution (Specification 6707).

Druwhit Metal Products Co., Reno, Nev., care of Gaylord & Lovel, 1332 Russ Building, San Francisco, representatives, has been organized by M. F. Taylor and Glen Dawson, both of Reno, to manufacture metal products.

Department of Finance, Santa Monica, Cal., Frank A. Helton, commissioner, has plans for municipal automobile service, repair and garage building at city yards. Cost about $75,000 with equipment.

King Packing Co., Nampa, Idaho, meat packer, plans expansion and improvements, including two-story unit, 60 x 60 ft., one-story cold storage plant, 30 x 40 ft., and other buildings. Cost over $70,000 with equipment. George King, president.

Electrical Products Co., 940 Sandy Boulevard, Portland, filed plans for one-story storage and distributing plant, 60 x 75 ft.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 15 for one mortising machine and one shaper (Schedule 7534), one sliding head drilling machine (Schedule 7581), one metal sawing machine (Schedule 7582), one ball-bearing bandsaw (Schedule 7586), one floor type universal milling machine (Schedule 7584), all motor driven, two Diesel engines, two Diesel engine-driven generators and spare parts (Schedule 7570), and 120,750 lb. admiralty metal condenser tubes (Schedule 7577) for Mare Island Navy Yard; 24 hollow forged exhaust valves (Schedule 7540), 72 metal aircraft propeller hubs (Schedule 7572), and one concrete mixer (Schedule 7553) for naval air station, San Diego, Cal.

State Board of Education, Sacramento, Cal., has authorized installation of manual training department in three-story and basement training school at State Teachers' College, Arcata, Cal. Bids to be asked soon on general contract. Cost $160,000. F. T. Georgeson, Sixth and C Streets, Eureka, Cal., architect.

CANADA

Public Utilities Commission, Woodstock, Ont., is considering installation of new electric pump in waterworks plant. R. L. Murray, 248 Dundas Street, is chairman.

Burlington, Ont., plans improvements to waterworks system, including erection of a new pumphouse and equipment. Cost about $130,000 G. H. Power, Oakville, Ont., is engineer.

Simms Motor Units of Canada, Ltd., a subsidiary of Simms Motor Units, Ltd., England, has obtained premises at 484 Dundas Street West, Toronto, for manufacture of batteries, etc.

Canadian Iron Foundries, Ltd., Three Rivers, Que., will establish a pant for manufacture of water pipe valves, etc.

Vulcan Engineering Works, Ltd., Granville Island, Vancouver, B. C., machine shop, was recently destroyed by fire. Owners will rebuild.

Reno Gold Mines, Fawn Creek, near Nelson, B. C., mill was destroyed by fire Feb. 25. Loss about $95,000. Company will rebuild.

FOREIGN

National Railways of Mexico, Mexico City, Mexico, will use fund of more than 2,000,000 pesos (about $1,000,000) for extensions and improvements, including construction of branch lines, replacement of obsolete equipment, shop facilities and equipment, repairs to rolling stock and parts replacements, etc. Appropriation made available through recent agreement of Mexican Government for moratorium on interest payments until 1934. Xavier Sanchez Majorada, chief executive of railway, in charge.

Soviet Oil Trust, Soviet Russian Government, Moscow, plans erection of new gasoline refining plant at Grozny, North Caucasas district, comprising group of 24 cracking units with auxiliary equipment. Project includes by-products plant for production of asphalt and allied products. Work is scheduled to begin in spring. Cost about 100,000,000 rubles ($50,000,000). Plans are also under way for new oil refinery near Orsk, to include construction of pipe line from Emba oil fields to refinery site, about 780 kilometers (488 miles). Completion is scheduled by close of year. Cost over 50,000,000 rubles ($25,000,000). Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

Chinese Service Bureau, 75 Federal Street, Boston, Dr. Tehi Hsieh, director, has information regarding proposed purchase of about 31 airplanes and equipment for warfare service at Shanghai and vicinity.

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MEMPHIS . . . 6-4836 . . . Distributing Warehouse for Pipe, Sheets, Spikes and Wire Products; Reinforcing Bar Warehouse and Fabricating Shop

By-Product Coke Output Declined in January

Production of by-product coke in the United States in January was 2,100,923 tons, a decrease of 6 per cent from the December output of 2,233,997 tons, as compared with 3,092,153 tons in January, 1931, according to the Bureau of Mines. Beehive coke production in January is estimated at 87,900 tons, a 7.2 per cent increase over the December total of 82,000 tons, and compared with 163,000 tons produced in January last year. Canadian coke production in 1931 was 1,835,622 tons, a 23 per cent decrease from the 1930 output of 2,385,994 tons.

2,800 Airplanes Produced in 1931

Airplanes manufactured in the United States during 1931 totaled 2800, of which 1807 were for domestic civil use, according to the records of the Aeronautics Branch, Department of Commerce. These production figures are based upon airplane licenses and identifications of unlicensed airplanes recorded by the Department of Commerce, and on reports as to military deliveries and airplanes exported. There is a possibility, however, that there may have been some craft manufactured during 1931 for which licenses or identifications have not yet been sought.

A comparison of 1931 production figures with those for 1930 shows an increase of 8.9 per cent in monoplanes and a decrease of 58.8 per cent in biplanes.

The 1807 airplanes manufactured for domestic commercial or civil use during 1931 were produced by 345 firms or individuals. There were three companies which produced 100 or more airplanes each. Each of five companies manufactured 50 to 99; nine companies manufactured 25 to 49 each; 10 companies manufactured 10 to 24 each; and 36 companies produced between two and nine each. There were 284 companies or individuals producing one plane each during 1931.

Foundry Equipment Orders Unchanged in January

Foundry equipment orders in January, represented by the index figure 20.5, reflected virtually no change from bookings in December, which were indicated by the index figure 20.9, according to the Foundry Equipment Manufacturers Association. Orders in those two months, while slightly ahead of bookings in November, were considerably below those in September and October, when the index figures were 31.9 and 44.8 respectively. The association takes as its base 100 from the average monthly shipments of 1922, 1923 and 1924.

NEW TRADE PUBLICATIONS

Lighting Fixtures.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2235 illustrates various vaporproof lighting fixtures for industrial purposes. Lists prices are given.

Turbo-Blowers and Turbo-Compressors.—Allis-Chalmers Mfg. Co., Milwaukee. Folder illustrates various types of turbo-blowers and turbo-compressors.

Boilers.—Wilfred R. Wood and Irving Trust Co., receivers of Combustion Engineering Corpn., 200 Madison Avenue, New York. Pamphlet describes C-E multiple circulation boiler, designed to provide positive and unrestricted circulation.

Furnaces.—W. S. Rockwell Co., 50 Church Street, New York. Bulletin 320 pictorially presents a number of the company's electric and fuel furnaces for ferrous and non-ferrous metals and ceramic and chemical products.

Floor Plating.—Inland Steel Co., Chicago. A new four-way non-skid floor plate is described in a folder, which includes data regarding sizes, weights and price extras.

Motors.—Reliance Electric & Engineering Co., Cleveland. Illustrated folder describes type-T two-pole motors for direct current.

Pumps.—Byron Jackson Co., Berkeley, Cal. Bulletin 314, 38 pages, contains informative data regarding the company's centrifugal oil refinery pumps.

Roller Hearth Furnaces.—W. S. Rockwell Co., 50 Church Street, New York. Illustrated bulletin presents technical information on physical factors affecting production of uniformly heat-treated products, with reference to the company's roller hearth furnace as one method of effecting control under conditions of continuous operation.

Hand-Lift Trucks.—Yale & Towne Mfg. Co., Philadelphia. Four illustrated folders describe the company's line of hand-lift trucks.

Recording Instruments.—General Electric Co., Schenectady, N. Y. Illustrated catalog, with price lists, covers specifications, etc., of the company's switchboard and portable recording instruments.

Handling Equipment.—Cleveland Electric Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio. Folder illustrates overhead handling equipment for the machine shop.

Air-Setting Cement.—Charles Taylor Sons Co., Cincinnati. Brochure describes P. B. Sillimanite air-setting cement for furnace construction and repairs.

Mechanical Stokers.—Stoker Manufacturers Association, foot of Walker Street, Detroit. Forty-eight types of mechanical stokers, manufactured by 14 companies, are illustrated and described in a 40-page catalog prepared by the association.

Hoisting and Conveying Equipment.—Wright Mfg. Co., Bridgeport, Conn. Catalog 15 describes briefly the company's hand-operated hoisting and conveying equipment.

Industrial Equipment.—Harold E. Trent Co., 618 North Fifty-fourth Street, Philadelphia. Electric melting pots, melting and pouring pots, soldering troughs, thermometer calibration tanks, kettles and ovens are described in an eight-page booklet.

Boilers.—Babcock & Wilcox Co., 85 Liberty Street, New York. Type-H boiler is described in an illustrated bulletin, which includes setting plans showing installation in widely diversified industries using many different types of firing.

Motors.—General Electric Co., Schenectady, N. Y.—Illustrated catalog describes the company's type MD motor, suitable for steel mills.

Electric Trucks.—Elwell-Parker Electric Co., 629 Euclid Avenue, Cleveland. Booklet illustrates and describes various applications of electric trucks designed for special handling jobs.

Chrome Brick.—E. J. Lavino & Co., Bullitt Building, Philadelphia. Interesting folder presents advantages of Lavino chrome brick in the construction of basic open-hearth furnace, in soaking pits, recovery furnaces and metal mixers.

Speed Reducers.—Gears & Forgings, Inc., Cleveland. Bulletin D, 18 pages. Describes motorized speed reducers of the planetary type built by this company. Points out that a motorized speed reducer occupies 40 per cent less space than a separate motor and speed reducer. Advantages of the planetary system of gearing are given, as are also the specifications and types of drive for which the speed reducer may be used. Various charts are included.

Wire Rope.—Hazard Wire Rope Co., Wilkes-Barre, Pa., has issued a booklet describing the use of "Lay-Set Preformed" wire rope.

Special Quality Steel for Ship Building

(*Concluded from page* 551)

0.04 per cent phosphorus and not over 0.045 per cent sulphur.

Tests of 15 samples "as rolled" gave 90,500 lb. tensile strength, 51,600 lb. yield point, 20 per cent elongation, and 43 per cent reduction of area. Similar tests of 29 samples, machined to a round section with screwed ends, gave 88,400 lb. tensile strength, 46,340 lb. yield point, 19 per cent elongation in 8 in. and 56 per cent reduction of area.

A structural nickel steel, covered under standard specifications of the American Society for Testing Materials, has about 0.45 per cent carbon, 0.70 per cent manganese and 3.25 per cent nickel. The specifications call for a tensile strength between 85,000 lb. and 100,000 lb. and a yield point of 50,000 lb. Reduction of area must reach 25 per cent and elongation in 8 in., on material not over 1 in. thick, must reach 1,500,000 divided by the tensile strength.

A chrome-manganese-silicon steel containing 0.35 to 0.42 per cent carbon, 1.10 to 1.30 per cent manganese, 0.60 to 0.80 per cent silicon and 0.40 to 0.60 per cent chromium, has been used in shipbuilding. Its cost is said to be about 50 per cent above that of ordinary structural mild steel. It is said to be tough and easily machined, and can be heated and bent without hurting its physical properties.

A corrosion-resisting steel which does not come within the so-called stainless or rustless classification, but offers some resistance to active corrosion, has been developed. This contains 4 to 6 per cent chromium, with 0.20 to 0.25 per cent carbon and 0.30 to 0.50 per cent manganese. For certain purposes this steel has shown from four to eight times the life of similar mild steel equipment. Its exposure to atmospheric conditions is said to form very close hard surface scales which retard corrosion. This costs from one and a half to three times as much as ordinary mild steel.

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